N70-12707
NASA CR-107165

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Technical Memorandum 33-430

Automated Status Reporting for Publications at the Jet Propulsion Laboratory

R. Van Buren

CASE FILE
COPY

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

November 15, 1969

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Technical Memorandum 33-430

Automated Status Reporting for Publications at the Jet Propulsion Laboratory

R. Van Buren

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

November 15, 1969

Prepared Under Contract No. NAS 7-100
National Aeronautics and Space Administration

Preface

The work described in this report was performed by the Technical Information and Documentation Division of the Jet Propulsion Laboratory.

Acknowledgment

The author appreciates the assistance of Robert H. Davidson of the Management Systems Section, whose cooperative and energetic efforts to solve many operational and programming problems contributed significantly to the success of the automated status reporting system. Credit also goes to the Administrative Computer Services Section, whose continuing efforts make the system really work.

Contents

Contents (contd)

Table

Figures

Contents (contd)

Figures (contd)

Abstract

An automated system has been originated at Jet Propulsion Laboratory to obtain and evaluate progress and status information relating to the production of formal publications. A brief description of these publications, together with an outline of the processes involved in editing, composing, and printing them, is given as a background for a discussion of the system itself.

The automated status reporting system produces on a weekly basis a series of computer printouts consisting of lists of active and completed jobs and various statistical and computational recaps. Examples of such printouts are shown, and the computer input requirements and methods are described.

Unique or interesting aspects of the computer program are cited, as well as some of the built-in constraints and disadvantages, and the possibility of program expansion is considered. Finally, the use of the program as a management tool is discussed and evaluated.

Automated Status Reporting for Publications at the Jet Propulsion Laboratory

I. Introduction

The Publications Section of the Jet Propulsion Laboratory is responsible for publishing the Laboratory's formal publications. The section handles a continuous workload of some 100 publications ranging in size from 20 to 2500 pages and ranging in production time from 5 days to several months. A convenient method of keeping track of these jobs without requiring a large amount of clerical help became obviously necessary, and the method devised is described in this memorandum.

The automated status reporting system consists of a program written in COBOL language for the IBM 360-40 computer, a method for providing weekly input information to the computer, and a series of computer printouts varying in length from 1 to 20 pages. With the automated status reporting system, it becomes possible not only to keep track of the work in process, but also to obtain a large amount of statistical data that can be used in making managerial decisions and in predicting workload.

II. The Production Environment

A. Formal Publications at JPL

The formal publications of the Jet Propulsion Laboratory fall into two major categories:

(1) Documents published by the Laboratory as technical reports, technical memorandums, space program summaries, planning reports, brochures, handbooks, books, flyers, and pamphlets. (These documents are referred to as formal publications.)

(2) Documents (papers or articles) published by various scientific and technical journals, or presented at various scientific and technical meetings or symposiums. (These documents are referred to as P jobs.)

These publications, constituting the formal reporting system of the Laboratory, are the means by which the Laboratory documents its activities in final form for dissemination to the general public. The content of these

publications covers a wide range of scientific and engineering disciplines, such as fluid physics, telecommunications, chemistry, rocket propulsion, biochemistry, engineering mechanics, mathematics, computer programming, spacecraft guidance and control, celestial navigation, astronomy, electronics, plasma physics, and many others.

The publications represent both progress reporting for current activities and final reporting for activities that have been concluded. The progress reports are published in bimonthly periodicals called Space Program Summaries, which are handled by the periodicals group of the JPL Publications Section. The final reports are published individually, and are handled by the reports group of the JPL Publications Section.

A scientist, for example, who is conducting an experiment in plasma physics, may report on that experiment periodically in the Space Programs Summary, and at the conclusion of the experiment he may write a final report that will be published by the Laboratory as a technical report or a technical memorandum. (The author may also publish his findings in one or more scientific journals.)

Because the procedures for handling periodical documents differ somewhat from those for handling single reports, the automated status reporting system differentiates between the two types of publications: those produced by the reports group and those produced by the periodicals group.

The JPL formal publications are typeset in a standard format. Journal article and meeting paper manuscripts are typewritten to the individual specifications of the journal or the symposium committee; and in the case of meeting papers, camera-ready copy is prepared for printing and distribution at the meeting.

B. The Production Process

The Publications Section receives manuscript copy and rough art work as its input material. The material for each formal publication is assigned to an editor, who is responsible for that publication from then on.

A simplified phase representation of the publications process at JPL is shown in Fig. 1. Each phase is given a letter symbol for easy status reference. In phase A (edit), the editor marks up the manuscript and rough art according to the standards and guidelines established by the Publications Section. After the editor has marked the manuscript and art, he reviews the material with the author. The editor then submits the copy to the typesetter, and submits the rough art to the art group of the Publications Section for the start of phase B of the production process.

Phase B (composition) consists of a number of activities resulting in camera-ready copy (material ready for the printer). The typesetter typesets the manuscript and provides the editor with several sets of galley proofs. The galley proofs are proofread and then are sent to the

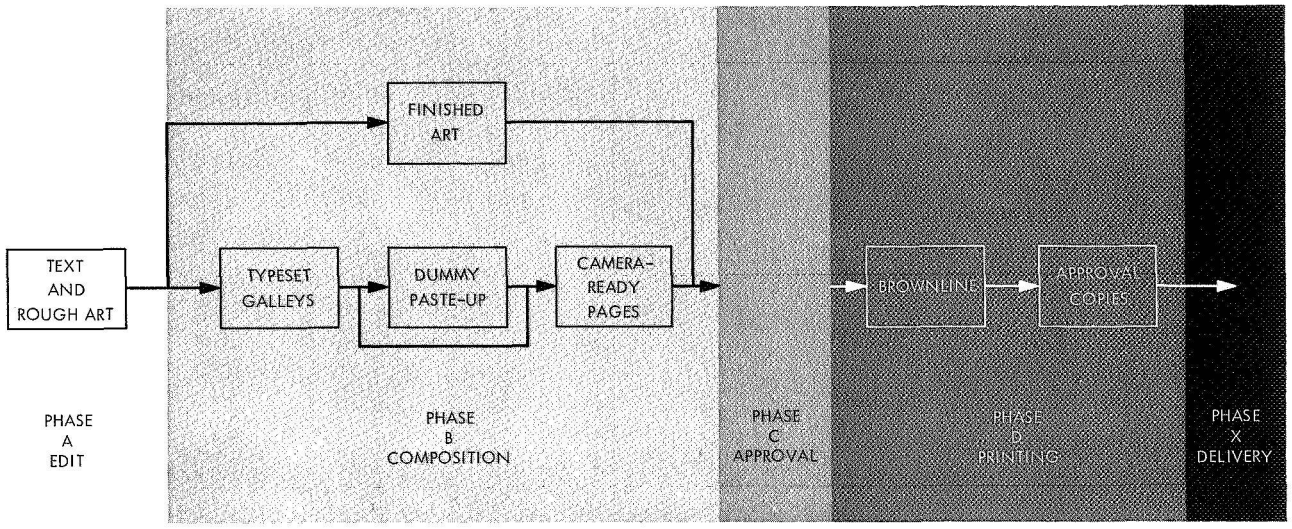


Fig. 1. Production phases of the JPL publications process

production group where they are cut apart and pasted into a facsimile of the final publication. This facsimile (called a dummy paste-up) is returned to the typesetter. The typesetter rearranges his lead galleys into pages exactly according to the layout indicated. The typesetter then pulls reproduction page proofs, which are returned to the editor. Final inking, such as table rules and special mathematical symbols, is done on the reproduction pages and they are then considered ready for the printing camera. Also, during this time period, the final illustrations are created by the art group from the edited rough art. Each illustration is checked and after any corrections are completed, the artwork is considered to be camera ready.

All JPL formal publications must be approved by JPL management before they are sent to the printer. Phase C represents this approval cycle, which consists of sending the camera-ready material sequentially to the various people from whom approval must be obtained. After the last approval signature, the material is ready for printing and is returned to the Publications Section.

Phase D constitutes the printing and binding phase. The camera-ready copy is sent to the printer, who photographs each typeset page and each illustration. Illustrations are now reduced to achieve the final size for the printed publication. The page and illustration negatives are stripped and registered together. A brownline proof copy is then made of each page (now showing both the text and the illustrations), and the brownline pages are folded, collated, and bound. The result is a facsimile of the final printed version.

The brownline is sent to JPL, where it is thoroughly reviewed for such things as correct stripping, proper registration of illustrations on the pages, and proper page sequence. The brownline is then returned to the printer with indicated corrections. After the appropriate corrections are made to the negatives, they are used to make lithographic printing plates. Several copies of the press run are hand-gathered, folded, trimmed, bound, and sent to JPL for approval. Upon approval, the printer binds the remaining copies, and the publication is then distributed.

When approval has been given by the Publications Section for the printer to bind the remaining copies of the report, the report is considered to be in the X phase. One phase not shown in Fig. 1 is the Q phase, which means that a job has been cancelled.

III. System Inputs and Outputs

A. Original Program Inputs

After the computer program had been written and debugged, it was ready to become operational. This meant that a complete set of input data had to be supplied to the computer in order to obtain the first operational printout.

A special form was made up to supply the keypunch operators with the exact data that they would punch into the machine. This form (Fig. 2) was laid out exactly like the IBM cards that would be fed into the machine. Each IBM card can accept 80 pieces of data. However, the input information consisted of more data than this, and consequently, two cards had to be used for each line item entry. The exact number of spaces allowed for each category of information is indicated on the form; for instance, the report identification number is allowed seven spaces, and the work order number is allowed five spaces.

The two cards for each line item entry are labeled A and B. The A card contains the current date, the report identification number, the work order number, the report title, the author, the number of units, the date received, the date due, and the project number. The B card contains the current date, the report identification number, the work order number, the phase, the *as of* date, the delinquency code, and the editor's name.

Since a line item entry is identified in the computer by the report identification number, it was necessary to repeat the report identification on the B card (although it was not necessary to repeat the work order number).

The original input to the computer took place in March 1968. Since we wanted to obtain a complete one-year history of the data as soon as possible, we decided to provide information as far back as the previous July, which was the beginning of the fiscal year. To accomplish this, we had to provide information for over 300 line items, all of which had to be entered on the input form by hand.

To keep better track of what we were doing, we decided to perform the operation in two steps. The first step was to enter into the computer all jobs that were activated since the previous July, and to consider those jobs as being in phase A. In actuality, many of these jobs had already been delivered or were in an advanced phase

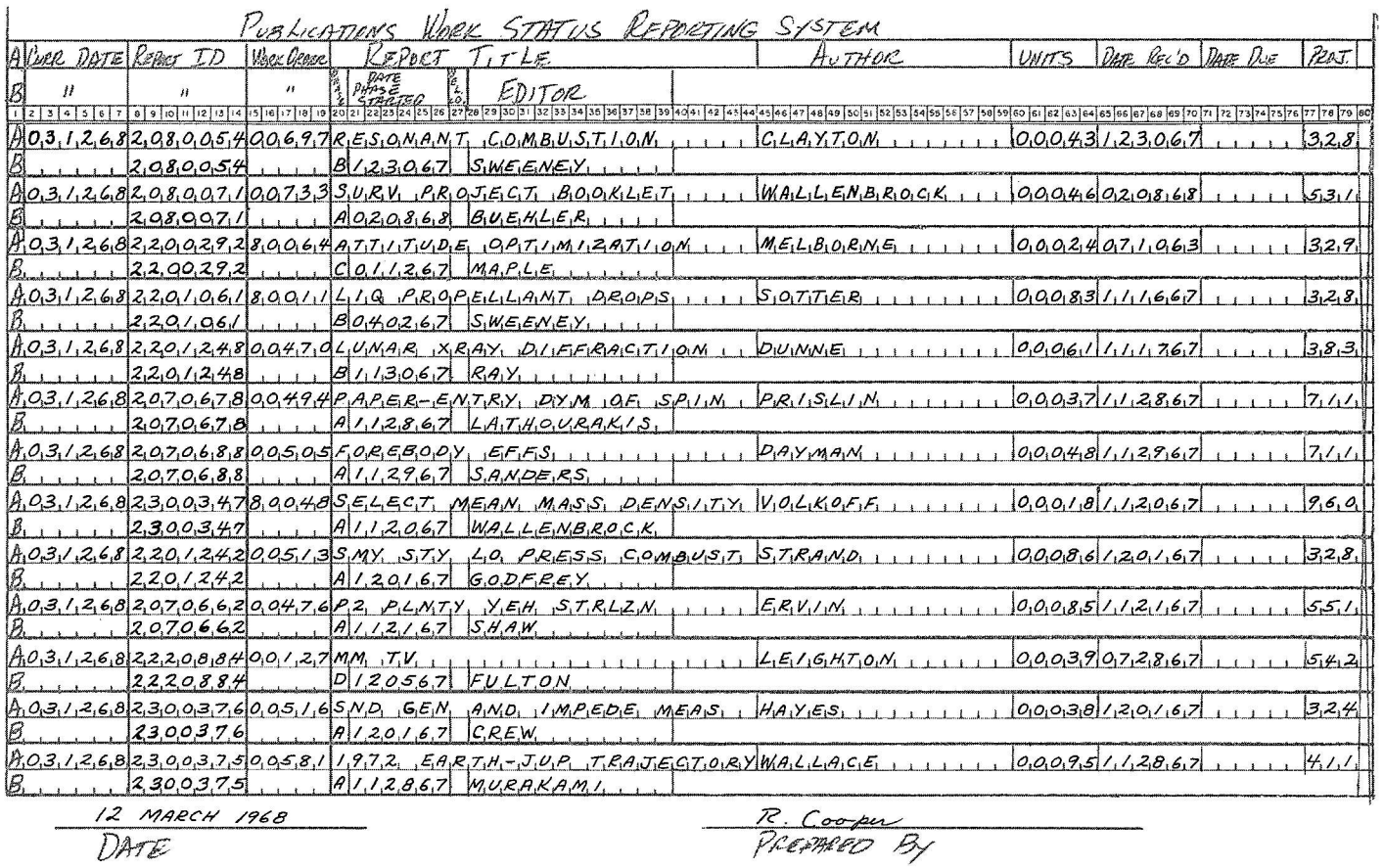


Fig. 2. Original input form

of production. The first printout from the computer, then, gave us a gigantic listing of the open (active) reports. The second step was to revise this first printout by updating each entry according to its then current status. The second printout, derived from this information, then represented an up-to-date listing of both open and completed jobs.

Once the basic data had been fed into the computer, it then became a matter of updating the information on a weekly basis in order to keep it current. This updating is done by having each editor mark up his Report Status listing, the primary printout of the entire system.

B. Primary Printout

The Report Status printout (Fig. 3) is the primary vehicle for the input and output of the entire system. A separate Report Status printout is provided for each editor, listing all jobs assigned to that editor in numerical sequence by publication number. The printouts are sequentially paginated by the computer in alphabetical order according to editor.

The Report Status printout contains 11 columns of information. The REPORT IDENT column indicates: (1) whether the publication is a reports group or a periodicals group document, (2) the type of publication (i.e., paper or article, bibliography, Technical Memorandum, Space Programs Summary, Technical Report), and (3) the publication number. In order to express all the necessary information, a special coding system is used for this column (see Section V).

Every task performed by the Publications Section is given a unique job number (different from the publication number). The job number, called a work order number, is used for collecting costs for each job and for keeping track of the various jobs in work; it is, in effect, a charge number, and is listed in the WORK ORDER column of the Report Status printout.

B315-03 REPORT STATUS -- WEEK ENDED SEP 05, 1969 EDITOR - LATHOURAKIS

REPORT IDENT	WORK ORDER	PRJ	REPORT TITLE	AUTHOR	UNITS	DATE RECVD	DATE DUE	PHASE	AS OF	DELQ CODE
2 09-0391	20294	328	LITERATURE REVIEW	RHEIN	24	07/30/69	/ /	A	07/31/69	
2 09-0436	20320	325	DECOMPOSITION STATES	PERLMAN	36	08/15/69	09/12/69	B	08/21/69	
2 09-0456	20335	361	SPECTROMETER PERFORMANCE	SCHAPER/SHAW	17	08/26/69	/ /	A	09/02/69	
2 09-0462	20339	970	INITIAL-VALUE PROBLEM	HINTZ	33	08/28/69	/ /	A	09/02/69	
2 20-1433	20250	384	DIELECTRIC CONSTANT	LANE	11	06/25/69	/ /	A	06/25/69	2
2 21-1408	20132	324	SHOCK TUBE - AIR VOL I	MENARD	490	03/31/69	/ /	B	07/10/69	
2 32-1451	20321	324	HYPERSONIC FLOW	SCHNEIDER	66	08/15/69	/ /	A	08/18/69	2

* *

ADDITIONS

Fig. 3. Report Status printout

Each project performed by JPL for NASA is assigned a "project number" by the Laboratory, and this number is used to identify the project for accounting purposes throughout the life of the project. Since every Laboratory publication relates to one or another project, this relation is indicated in the PRJ column of the Report Status printout. It should be noted that the term *project* used here refers to any task assigned to JPL by NASA, including but not confined to flight projects. Thus a research task in fluid physics assigned to JPL would be a project.

The REPORT TITLE column contains an abbreviated title for the report. The AUTHOR column lists only the last name of the author. In cases where there are more than one author, the second author is also listed if possible; otherwise only the senior author is listed. Additional authors may or may not be indicated by the expression et al.

The UNITS column indicates the size of the publication; a unit is a double-spaced typewritten manuscript page or an individual illustration. The DATE RECVD (date received) and DATE DUE columns are self-explanatory.

The PHASE column indicates whether the publication is in the edit, composition, review, printing, or delivery phase, or whether it has been cancelled. The AS OF column indicates the starting date for each phase.

The DELQ CODE column is actually a misnomer, since it is only partially used to indicate delinquency. A "1" in this column indicates that the publication has been held up for reasons beyond the control of the editor; such reasons would include a "hold" by the author for rewriting purposes, a delay in approval by management, etc. When the publication again becomes active, the "1" is dropped. A "2" in this column indicates that the editor has been unable to start the job because of his workload; when he does begin to work on the job, the as of date is changed and the "2" is dropped from the DELQ CODE column.

Each editor is given two copies of the Report Status printout; one he keeps for his own file and the other he uses to mark up for the weekly computer input. Another copy of the Report Status printout is used by supervision to keep track of each editor's workload. This weekly updated Report Status printout becomes the source for all the other computer printouts.

C. Supplemental Printouts

Nine supplemental printouts are derived from the Report Status printout information (Fig. 4). These printouts are:

(1) Open Reports Listing.

(2) Completed Reports Listing.

(3) Editor Recap for the reports group.

(4) Editor Recap for the periodicals group.

(5) Open Reports Listing Delinquency Recap.

(6) Cumulative Units by Project Identification.

(7) Recap of Units by Series of Project Identification.

(8) Publications Work Status Proof List.

(9) Control Sheet.

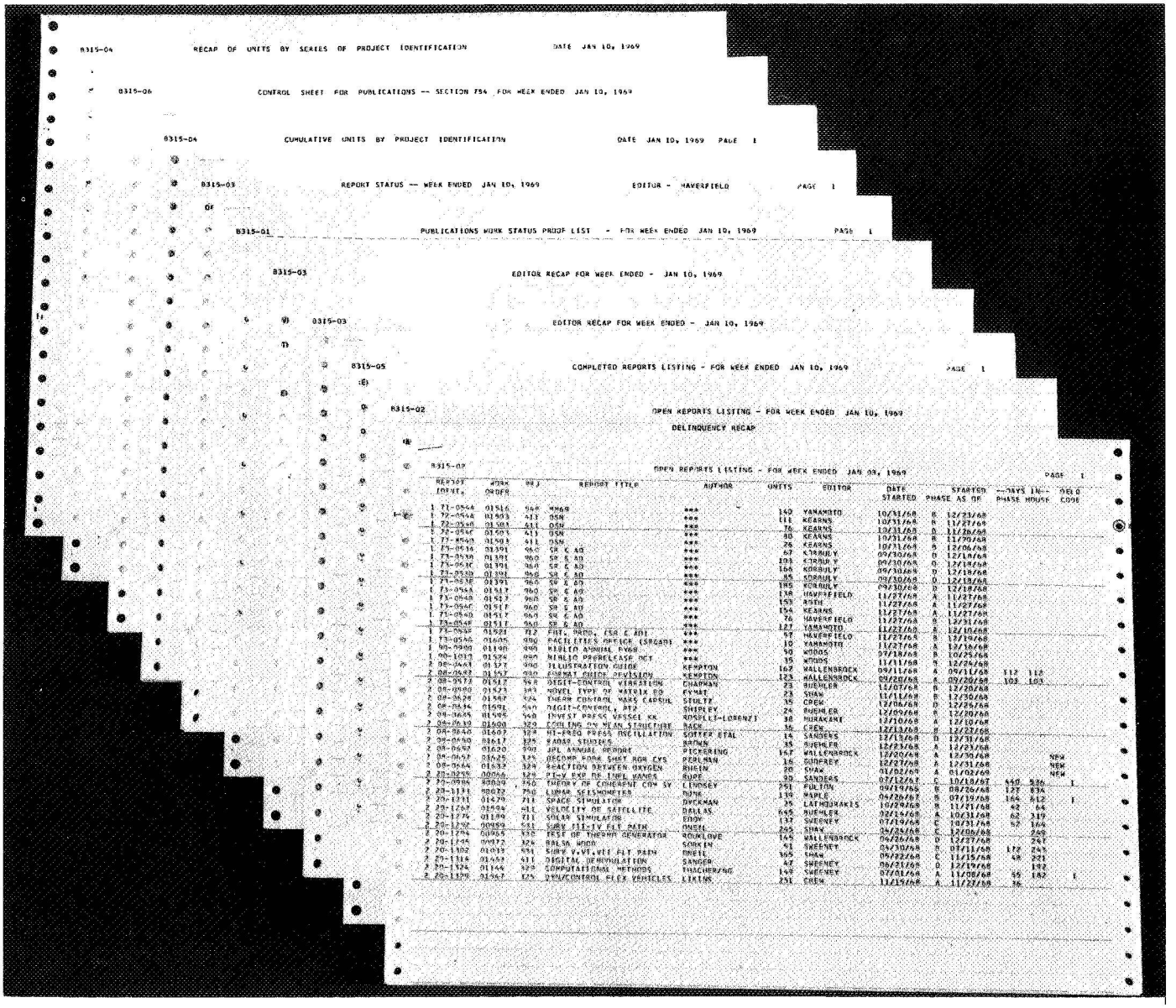


Fig. 4. The computer printout package

The first 7 of these printouts are operational, while the last 2 are printed for the purpose of checking the accuracy of the keypunching and computer running operations (the two check printouts are discussed in Section IV). All of the printouts are produced weekly and four copies are delivered to the Publications Section.

1. Open Reports Listing printout. The Open Reports Listing is a list of all active jobs, as determined by the phase. Any job in the X (delivered) or Q (cancelled) phase does not appear on the open listing. The jobs are listed in numerical sequence by publication number.

The Open Reports Listing (Fig. 5) contains all of the columnar information of the Report Status printout plus two additional columns: DAYS IN PHASE and DAYS IN HOUSE. The DAYS IN PHASE column indicates the number of days that a publication has been in the phase shown. However, a publication is not considered delinquent until it has been in one phase for more than 30 days, and until that time nothing will appear in the DAYS IN PHASE column. Similarly, the DAYS IN HOUSE column indicates the number of days that a publication has been "in house," except that, in this case, no indication will appear for the first 60 days.

8315-02 OPEN REPORTS LISTING - FOR WEEK ENDED SEP 05, 1969

REPORT IDENT.	WORK ORDER	PRJ	REPORT TITLE	AUTHOR	UNITS	EDITOR	DATE STARTED	STARTED PHASE	STARTED AS OF	--DAYS IN-- PHASE	--DAYS IN-- HOUSE	DELQ CODE
2 20-1320	20271	392	CAPSULE SYS, STERIL PROG	HOFFMAN/ETAL	94	MURAKAMI	07/09/69	A	07/09/69	59		2
2 20-1321	20286	320	MV67 SOLAR PANEL	GOLDSMITH	60	MAPLE	07/23/69	A	07/23/69	45		2
2 20-1324	01144	329	COMPUTATIONAL METHODS	THACHER/NG	149	SWEENEY	07/01/68	A	11/08/68	300	427	1
2 20-1357	20204	324	THREE BLUNT CONES	MARKO	100	SHAW	05/16/69	B	07/18/69	50	112	
2 20-1360	50014	329	THREE BODY PROBLEM	BROUCKE	411	MURAKAMI	11/01/68	B	07/09/69	59	307	
2 20-1377	01601	328	RESONANT COMBUSTION	KOVITZ	42	BUEHLER	12/13/68	B	06/20/69	78	265	1
2 20-1380	01614	451	CODED COMM	LINDSEY	36	MAPLE	12/23/68	D	08/13/69		255	
2 20-1382	50012	329	MASS OF JUPITER	ZIELENBACH	120	MAPLE	01/07/69	B	08/18/69		241	
2 20-1391	20048	548	FAR ENCOUNTER SENSOR	CARPENTER	63	SHAW	02/07/69	D	08/20/69		211	
2 20-1392	50013	325	WEATHER DATA LNK/DS APPS	SHUMATE ET AL	90	MAPLE	02/07/69	B	06/23/69	75	211	
2 20-1394	20054	411	PROP PLANAR PLASMA	NORGARD	115	SHAW	02/10/69	B	08/29/69		208	
2 20-1397	50019	328	HYDRAULIC CHARACTERISTICS	REIBLING	69	MAPLE	02/12/69	C	08/28/69		206	
2 20-1403	50021	328	COLD-FLOW EXP INV	STRAND	46	MURAKAMI	03/24/69	D	08/25/69		164	
2 20-1404	50022	540	BRUSHLESS DC MOTORS	BAHM	65	MURAKAMI	03/24/69	B	06/27/69	71	164	
2 20-1405	50023	325	SEQ EST OF STATES	BEJCZY	95	MAPLE	03/25/69	B	06/26/69	72	163	
2 20-1406	20128	328	SATURETHANE PROPELLANTS	ROBILLARD	175	WALLENBROCK	03/28/69	B	08/07/69	31	160	
2 20-1409	20142	325	FAULT-TOLERANT NAVIG.	AVIZIENIS	25	FULTON	04/03/69	B	06/16/69	82	155	
2 20-1413	20151	384	XTSV ENG BIBLIO GRPH APPS	DEO	290	GODFREY	04/15/69	B	07/23/69	45	143	
2 20-1415	50029	711	JPL 25-FT SPACE SIMULATOR	HARRELL-ARGOUD	44	BUEHLER	04/18/69	C	08/29/69		140	
2 20-1416	20169	324	THERMAL ANALYSIS SYSTEM I	HULTBERG ET AL	140	CREW	04/24/69	A	04/24/69	134	134	2
2 20-1417	20170	451	RF PERF 210-FT ANTENNA	BATHKER	54	SHAW	04/24/69	A	08/21/69		134	1
2 20-1418	20173	328	BALLISTIC EVALUATION	ANDERSON	40	GODFREY	04/24/69	B	06/04/69	94	134	
2 20-1419	50031	325	CAPSULE PACKAGING	READ	43	CREW	04/25/69	A	04/30/69	128	133	2
2 20-1420	20178	320	METAL CERAMIC SEALS	PHILLIPS	65	SHAW	04/30/69	B	08/28/69		128	
2 20-1421	50030	384	CIRCULAR RINGS	WILLIAMS	70	BUEHLER	04/28/69	B	08/21/69		130	
2 20-1423	20195	335	GAMMA RAY SPECTROMETER	METZGER	33	SHAW	05/12/69	B	07/02/69	66	116	
2 20-1425	20201	324	COMPUT'N PART'N DATA	HORTON	120	GODFREY	05/15/69	B	08/28/69		113	
2 20-1426	20203	320	BALLOON SOLAR CELL	GREENWOOD	41	BUEHLER	05/16/69	B	08/13/69		112	
2 20-1427	50033	320	RADIOISTOPE GENERATORS	MILLER	77	BUEHLER	05/21/69	A	05/22/69	106	107	2
2 20-1429	50034	970	COMPUTER CIRCUIT ANAL	SCHNEIDER	75	BUEHLER	05/29/69	A	06/02/69	96	99	2
2 20-1430	50035	451	SCATTERED PATTERNS	LUDWIG	159	BUEHLER	05/29/69	A	05/29/69	99	99	2
2 20-1432	20218	325	PN SEQUENCE GENERATION	PERLMAN	25	MAPLE	06/03/69	B	07/11/69	57	95	
2 20-1433	20250	384	DIELECTRIC CONSTANT	LANE	11	LATHOURAKIS	06/25/69	A	06/25/69	73	73	2
2 20-1436	20241	324	HEAT SHIELD TECH	NAGLER	167	SHAW	06/19/69	A	06/20/69	78	79	2
2 20-1437	20244	320	GTTRNG ON ALK MET CORR	PHILLIPS	50	GODFREY	06/23/69	A	06/23/69	75	75	2
2 20-1438	20247	328	STRAIN ENERGY	GLUCKLICH	80	RAY	06/23/69	A	06/24/69	74	75	2
2 20-1443	20256	510	LUNAR SURFACE TEMPS	JAFFE	210	SHAW	06/27/69	A	07/10/69	58	71	2
2 20-1447	20293	329	LAMINAR HEAT FLOW	BOSE	42	SWEENEY	07/30/69	A	07/30/69	38		2
2 20-1448	20298	324	SHOCK WAVE STRUCT OF GAS	PASSAMANECK	59	MURAKAMI	08/01/69	A	08/04/69	34		2
2 20-1452	20327	548	SUN SENSOR	SCHMIDT	23	MAPLE	08/21/69	A	08/21/69			2
2 20-1454	20342	386	SURVIVAL IN DESERT SOIL	CAMERON	20	SHAW	09/02/69	A	09/03/69			NEW 2
2 21-1408	20344	324	HELIUM AND ARGON-VOL III	MENARD	420	LATHOURAKIS	09/04/69	A	09/04/69			*1*
2 21-1408	20132	324	SHOCK TUBE - AIR VOL I	MENARD	490	LATHOURAKIS	03/31/69	B	07/10/69	58	157	
2 22-1240	20174	328	ELAS-COMPUTER PROJ VOL II	UTKU-AKYUZ	21	CREW	03/19/68	C	08/29/69		529	
2 22-1408	50032	324	SHOCK TUBE TABLES VOL II	MENARD-HORTON	423	MURAKAMI	05/05/69	A	05/05/69	123	123	2
2 29-1240	20198	970	ELAS-COMPUTER VOL II ADD	UTKU	300	CREW	05/13/69	B	06/13/69	85	115	
2 30-0338	20167	724	SUMMARY ATS AP MOTOR	ANDERSON	146	SHAW	04/23/69	A	09/02/69		135	
2 30-0357	20219	384	ADD REV COMP MAT S/C APP	MOSS	250	GODFREY	06/03/69	A	06/04/69	94	95	2
2 30-0419	01449	364	LUNAR ORBITER DATA	LORELL	293	SWEENEY	10/22/68	A	11/01/68	307	316	
2 30-0420	01570	411	DSS TIME-SHARED COMPUTER	TAUSWORTHE	130	SWEENEY	11/27/68	B	06/19/69	79	281	

Fig. 5. Open Reports Listing printout

A convenient feature of the Open Reports Listing is that the first time a publication appears on the list the word NEW is printed just to the left of the DELQ CODE column (Fig. 5). The new jobs for that week can thus be easily spotted.

The DELQ CODE column has two separate functions: it indicates the delinquency or backlog status of the publication as indicated on the Report Status printout, and it indicates a rejection of the input data by the computer. There are two cases in which the computer rejects input data: when an attempt is made to change or correct information on a job that (according to the computer) does not exist; and when an attempt is made to add a new job that is already on the list. In the first case, the computer will print *2* in the DELQ CODE column; in the second case, the computer will print *1*.

2. *Completed Reports Listing printout.* The Completed Reports Listing (Fig. 6) is a list of all jobs that have been completed or cancelled over the previous 52 weeks. It contains basically the same columnar information as the Report Status printout and the Open Reports Listing, except that it does not indicate phase, as of date, or delinquency information. Instead, DATE STARTED and DATE COMPLETED columns are included. The DATE STARTED column picks up the information from the DATE RECVD column of the Report Status printout.

The DATE COMPLETED column indicates the date that the publication was placed in the X (completed) phase. A publication that has been delivered (X phase) is shown on the Report Status printout one time only; thereafter it does not appear on this printout, but does appear on the Completed Reports Listing.

B315-05 COMPLETED REPORTS LISTING - FOR WEEK ENDED SEP 05, 1969

REPORT IDENT	WORK ORDER	PRJ	REPORT TITLE	AUTHOR	UNITS	EDITOR	DATE STARTED	DATE COMPLETED	
2 09-0418	20309	574	LNR ORBTR GRVTY ALALYSS	LORELL	10	GODFREY	08/08/69	08/26/69	
2 09-0419	20310	552	AIAA ABSTRACT	MUKHOPADHYAY	5	SWEENEY	08/11/69	08/18/69	
2 09-0426	20312	384	S/C-BASED NAV INSTRUMENT	DUXBURY	24	MURAKAMI	08/12/69	08/19/69	
2 09-0427	20313	548	MARINER STAR TRACKER	GOSS	2	BUEHLER	08/12/69	08/15/69	
2 09-0431	20314	970	MARINER GUIDANCE	SCULL	20	BUEHLER	08/13/69	08/26/69	
2 09-0433	20316	540	EXPULSION BLADDERS	LEISING/STOCKY	48	SWEENEY	08/14/69	09/02/69	NEW
2 09-0444	20328	552	BIO BURDEN	TAYLOR ET AL	38	SWEENEY	08/21/69	08/27/69	
2 09-0448	20329	328	MIXING PROPELLANTS	HOUSEMAN	13	MAPLE	08/22/69	09/04/69	NEW
2 09-0449	20331	324	TABLE MOUNTAIN RADIOMETRY	LAUE	20	CREW	08/22/69	09/05/69	NEW
2 09-0461	20338	328	TURBULENT BOUNDARY	BACK	42	BUEHLER	08/28/69	09/05/69	NEW
2 20-0255	00066	328	PT-V EXP OF INFL VANES	RUPE	90	SANDERS	07/12/67	03/18/69	
2 20-0767	01401	411	RANGER IX FLIGHT PATH	VEGOS	380	MURAKAMI	04/08/68	11/15/68	
2 20-0809	01284	421	APOLLO S-BAND SYSTEM	BUNCE	35	RAY	07/30/65	09/10/68	
2 20-0986	20085	451	THEORY OF COHERENT COM SY	LINDSEY	251	FULTON	09/19/66	07/23/69	
2 20-0997	01346	591	SIMPLIFY SEQUENTIAL MACHS	EBERSOLE-LECOQ	124	BUEHLER	06/28/66	11/19/68	
2 20-1064	80012	411	DEVEL AND PERF OF 210FT A	MERRICK ET AL	13	MURAKAMI	11/10/66	11/12/68	Q
2 20-1089	20104	940	ERRATA-MATH MODEL	CHELSON	1	SWEENEY	03/07/69	04/03/69	
2 20-1133	80072	750	LUNAR SEISMOMETER	DUNK	139	MAPLE	04/26/67	08/18/69	
2 20-1230	00696	548	FIRING SQUIBS BY LOW VOLT	EARNEST	32	CREW	10/23/67	10/18/68	
2 20-1231	01479	711	SPACE SIMULATOR	DYCKMAN	25	LATHOURAKIS	10/29/68	01/31/69	
2 20-1232	00383	547	ELEC QUAL ASSURE OF COMPS	DANIELS	198	SANDERS	10/26/67	11/12/68	Q
2 20-1246	01130	531	SURVEYOR V PART III	PROJ OFFICE	250	RAY	04/11/68	10/07/68	
2 20-1266	20043	547	FAILURE RATE ANALYSIS	WRIGHT	32	MAPLE	02/03/69	06/12/69	
2 20-1274	01189	711	SOLAR SIMULATOR	EDDY	137	SWEENEY	07/19/68	02/06/69	
2 20-1281	00864	384	BINARY CHAN INTERFERENCE	KOERNER	74	MAPLE	03/20/68	12/09/68	
2 20-1282	01260	531	IMPROVED NITROGEN	VANGO	30	RAY	08/15/68	10/31/68	
2 20-1283	00883	328	PERF LIQ ROCKET ENG	CLAYTON	40	ANNIGIAN	03/26/68	09/26/68	
2 20-1284	00888	547	MV67 TEMP CONT	DUMAS	109	SHAW	03/27/68	09/11/68	
2 20-1285	00889	531	SURV I-II FLT PATH	THORNTON	232	ANNIS	03/27/68	08/30/68	DROPPED
2 20-1289	01146	531	SURV DYNAMIC ENVIRONMENT	PARKER	298	SWEENEY	04/11/68	12/19/68	
2 20-1292	00959	531	SURV III-IV FLT PATH	ONEIL	245	SHAW	04/24/68	03/03/69	
2 20-1294	00965	320	TEST OF THERMO GENERATOR	ROUKLOVE	145	WALLENBROCK	04/26/68	01/21/69	
2 20-1295	00972	324	BALSA WOOD	SORKIN	51	SWEENEY	04/30/68	07/18/69	
2 20-1296	00987	329	FORM OPT/RAD PLAN DATA	CHANDLEY	38	SANDERS	05/07/68	11/11/68	
2 20-1297	00994	383	LUNAR SPECTROM	METZGER	45	MAPLE	05/08/68	10/07/68	
2 20-1300	01024	451	X-BAND GROUND ANTENNA	BATHKER	77	SWEENEY	05/21/68	11/18/68	
2 20-1302	01033	531	SURV V,VI,VII FLT PATH	ONEIL	365	SHAW	05/22/68	05/27/69	
2 20-1303	01027	547	SOLAR FORECASTING	GONZALEZ	99	MAPLE	05/21/68	11/25/68	
2 20-1305	01065	325	MARINER DISTURB TORQUES	PRELEWICZ	104	BUEHLER	06/05/68	10/04/68	
2 20-1306	01067	329	INFO FOR ASTRO CALC 68	MELBOURNE	140	SANDERS	06/05/68	11/05/68	
2 20-1307	01084	421	CONSIST LUN ORB RESID	MULLER	62	SHAW	06/13/68	09/09/68	
2 20-1308	01093	384	ELASTIC WAVE PROPAGATION	ZIV	84	WALLENBROCK	06/14/68	09/09/68	
2 20-1309	01107	970	SBSTR STR/DEP EVP CARBON	FISCHBACH	10	FULTON	06/19/68	11/01/68	
2 20-1310	01108	384	ETO-FREON 12 STUDIES	KALFAYAN	73	SHAW	06/19/68	10/22/68	
2 20-1312	01116	329	POLY SMOOTHING FORMULAS	SENTNER	86	SHAW	07/19/68	12/20/68	
2 20-1313	01121	320	SKY EFFECT	RITCHIE	21	MAPLE	06/21/68	10/28/68	
2 20-1314	01453	411	DIGITAL DEMODULATION	SANGER	47	SWEENEY	06/21/68	01/13/69	
2 20-1315	01123	548	INT UHF/VHF REC ON M-V	CASE/KEELER	75	SANDERS	06/24/68	12/31/68	
2 20-1318	01134	329	TRANSPORT EQS	HARSTAD	34	MAPLE	06/25/68	09/30/68	
2 20-1323	20141	531	SURV ENV TEST	ORLIK	44	SHAW	04/04/69	06/16/69	

Fig. 6. Completed Reports Listing printout

All jobs on the Completed Reports Listing are considered to have been delivered to the customer, except those marked Q (cancelled). The first time that a publication is added to the list the word NEW appears to the right of the DATE COMPLETED column, so that newly completed jobs may easily be spotted.

All jobs that have been completed for more than one year, as measured by the date of the current Completed Reports Listing, are dropped from the list. In actuality, these jobs are dropped from the computer master tape immediately, but they are printed out on the Completed Reports Listing one last time with the indication DROPPED printed beside them. This provides a visual indication of those publications that will disappear from the list the following week.

At the end of the Completed Reports Listing is a total of all units completed over the past year. Since this total includes those publications that were cancelled, the figure represents the amount of work deleted from backlog rather than the amount of work actually delivered. The total for any one week also includes the line items marked DROPPED, so that the signal really means that these line items will be dropped the following week.

3. Editor Recap printout. The Editor Recap printout (Fig. 7) is a statistical display of the work in process; a separate printout is made for the reports and periodicals groups. This status data, presented in terms of each editor, consists of the number of units in each phase of the publication process, the number of units comprising

P jobs (papers or articles) and the number of units comprising formal publications with percentages for each type, the total number of units assigned to that editor, and the total number of jobs assigned to the editor (broken down into P jobs, formal jobs, and total jobs).

Also displayed is the weekly in-out flow of job units and the relative size of each type of job. The last four columns indicate the number of units received by the editor that week, the number of units completed by the editor that week, and the average size of both P jobs and formal jobs. The CURR PERIOD UNITS COMPL column consists of currently completed units placed in either the X or Q phase during the week, and represents the number of units marked NEW on the Completed Reports Listing. Similarly, the CURR PERIOD NEW UNITS column consists of units received during the week, and represents the number of units marked NEW on the Open Reports Listing.

The total figures at the bottom of the printout are self-explanatory, with the possible exception of the PERCENT OF WIP (work in process) line. The PERCENT OF WIP figures indicate the percent of total units in each phase; thus, in the case shown in Fig. 7, the 5224 units in phase A comprise 44% of all units in house.

The Editor Recap printout thus provides an analysis of each editor's backlog and of the total backlog for the group. This information is used in planning work assignments and in making overall operational decisions affecting the Publications Section.

4. Open Reports Listing Delinquency Recap printout. The Delinquency Recap printout (Fig. 8) is considered a part of the Open Reports Listing in that all of the information on it is computed from the DAYS IN PHASE and DAYS IN HOUSE columns of the Open Reports Listing. For each phase, the number of delinquent units

B315-03 EDITOR RECAP FOR WEEK ENDED - SEP 05, 1969

EDITOR NAME	CURRENT PERIOD BACKLOG - UNITS BY PHASE A	B	C	D	P-JOBS UNITS	P-JOBS PCT	FORMAL UNITS	FORMAL PCT	TOTAL UNITS	P JOBS	FORMAL JOBS	TOTL JOBS	-CURR PERIOD- NEW UNITS	UNITS COMPL	---AVERAGE--- JOB SIZE P-JOB	FORMAL
BUEHLER	1582	246	44		93	05	1779	95	1872	2	12	14		427	47	148
CREW	203	394	21		94	15	524	85	618	2	5	7		40	47	105
FULTON		25				00	25	100	25		1	1				25
GODFREY	360	450			10	01	800	99	810	1	7	8			10	114
LATHOURAKIS	151	526			110	16	567	84	677	4	3	7	33		28	189
MAPLE	796	1098	383	268	51	02	2494	98	2545	2	16	18		13	26	156
MURAKAMI	662	1720		46	5	00	2423	100	2428	1	10	11			5	242
RAY	320	59			89	23	290	77	379	3	2	5	74		30	145
SANDERS	42					00	42	100	42		1	1		76		42
SHAW	597	346		216	186	16	973	84	1159	4	10	14	20	17	47	97
SWEENEY	511	209			60	08	660	92	720	2	6	8		48	30	110
WALLENBROCK		478			303	63	175	37	478	3	1	4			101	175
TOTAL	5224	5551	448	530	1001	09	10752	91	11753	24	74	98	127	621	42	145
PERCENT OF WIP	44	47	04	05												

Fig. 7. Editor Recap printout

B315-02 OPEN REPORTS LISTING - FOR WEEK ENDED SEP 05, 1969

DELINQUENCY RECAP

PHASE	30-60 DAYS UNITS	PCT	60-90 DAYS UNITS	PCT	OVER 90 DAYS UNITS	PCT	TOTAL DELINQ	PCT	IN-HOUSE OVER 60 DAYS JOBS	UNITS	PCT
A	529	14	747	19	2579	67	3855	33			
B	1491	50	1302	44	163	06	2956	25			
C	0	00	0	00	0	00	0	00			
D	0	00	0	00	0	00	0	00			
									65	10099	86

Fig. 8. Open Reports Listing Delinquency Recap printout

is shown under three separate periods of time. The total number of delinquent units for each phase is also shown.

The percentage figures in the TOTAL column indicates for each phase the percent of total workload that is delinquent in that phase; for example, in Fig. 8, the 3855 units delinquent in phase A is 33% of the total number of units in work (11753 as shown in the TOTAL UNITS column of the Editor Recap printout). By contrast, the percentage figures in each of the three time periods indicates the percent of all phase A delinquencies for that period; in the figure, the 529 units shown delinquent in phase A for the period 30-60 days is 14% of the total 3855 units delinquent in the A phase.

The IN-HOUSE OVER 60 DAYS columns are self-explanatory. The information shown here may be compared to the information shown on the Editor Recap printout. The percentage figure relates to the number of units shown, not the number of jobs.

5. Cumulative Units by Project Identification printout. The Project Identification printout (Fig. 9) shows basically how the quantity of formal publications relates to the specific tasks of the JPL/NASA contract.

For each contract task, or project, three items of information are shown: BEG WIP (work in process at the beginning of the month), +NEW (additional workload given to the reports group in the form of rough draft manuscript and artwork), and −CMP (units completed). The information is accumulated week by week for each month of the fiscal year.

The beginning work in process figure (BEG WIP) for any month is arrived at arithmetically by taking the previous month BEG WIP, adding the +NEW figure, and subtracting the −CMP figure. The +NEW figure is determined for each month by the date received information shown on the Report Status printout. For example, if a report with 55 units is shown on the Report

B315-04 CUMULATIVE UNITS BY PROJECT IDENTIFICATION DATE SEP 05, 1969

PRJ	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TO DATE
361 BEG WIP		44	47										
+NEW	44	47											91
−CMP		44											
363 BEG WIP	110												
+NEW													
−CMP	110												
364 BEG WIP	293	293	293										
+NEW													
−CMP													
382 BEG WIP													
+NEW													
−CMP													
383 BEG WIP	25	40											
+NEW	40												40
−CMP	25	40											
384 BEG WIP	1031	882	897										
+NEW	24	63											87
−CMP	173	48											
386 BEG WIP		17	17										
+NEW	17		20										37
−CMP			17										
392 BEG WIP		133	94										
+NEW	133												133
−CMP		39											
401 BEG WIP	4036	3404	2679										
+NEW													
−CMP	632	725	385										
411 BEG WIP	1076	1132	953										
+NEW	56												56
−CMP		179											
421 BEG WIP													
+NEW													
−CMP													
451 BEG WIP	630	364	296										
+NEW		22											22
−CMP	266	90											

Fig. 9. Cumulative Units by Project Identification printout

Status printout with date received of 8/22/68, then 55 units are added to the +NEW figure for August. Similarly, the −CMP figure is determined for each month by the date completed information shown on the Completed Reports Listing printout. In evaluating these numbers, it should be remembered that the +NEW figure includes units that were received but that may have been cancelled later, and the −CMP figure includes units that were cancelled as well as units that were completed or delivered.

The TO DATE column indicates the cumulative number of input units to the reports group since the beginning of the fiscal year.

6. Recap of Units by Series of Project Identification printout. The Project Identification Recap printout (Fig. 10) has a rather awkward title, but it is simply a condensation of the information given on all the Project Identification printouts. All projects in the 300 series are combined, for example, and the totals are shown in the same format as for the Project Identification printout. The numbered series have significance with respect to the JPL/NASA contract in that each represents a specific grouping of tasks:

Series	*Task*
300	Research and advanced development
400	Tracking and data acquisition
500	Flight projects
700	Minor NASA tasks
900	Work performed on burden.

The total work in process for the latest month, shown at the bottom of the printout, agrees with the TOTAL UNITS column of the Editor Recap printout, if the +NEW and −CMP figures are added and subtracted, respectively.

IV. Operational Parameters

A. Weekly Status Information

To keep the publication status information current, each Report Status printout is updated by each editor and all status sheets are submitted to the keypunch operator, who, in turn, punches in only the information that has actually been changed or revised. Figure 11 is an example of a marked-up Report Status printout showing how changes and additions are made. Changes are made simply by crossing out the information and writing in the correct information above it.

However, the report identification number cannot be changed simply by crossing out the old number and writing in the new one. A special method for changing the report ID number is explained in Section V. Also, in changing the phase, or the as of date, or the delinquency code, all three must be changed; this input procedure is incorporated as a check system to ensure that every phase change entered carries a corrected date. In other words, you cannot change the phase without also changing the as of date or at least reentering the as of date. Similarly, a correction to the as of date may not be made unless a new entry is provided for the phase. In such a case, for example, the phase is simply crossed out and reentered above with the new as of date. There does not have to be a delinquency code entry in order to change the PHASE and the AS OF columns. However, if a delinquency code is to be entered or deleted, then the phase and as of information must be entered also.

A complete column must be crossed out and reentered, rather than a partial column, to avoid confusion during key punching; to change a single word in the report title, you must cross out the entire title and rewrite it.

There is a limitation on the number of characters allowed for each column. The REPORT TITLE column, for instance, must be kept to 25 characters or less; if a publication title is entered that is more than 25 characters, the computer will simply drop the excess characters.

Additions are made by inserting the information below the line of asterisks as shown in Fig. 11. The separation of vertical columns must be distinct, otherwise the keypunch operator will be confused. A special method for indicating certain letters is also used to avoid misunderstanding or confusion on the part of the keypunch operator. For example, a slash through the letter O ("oh") distinguishes it from a 0 (zero).

A publication is easily transferred from one editor to another simply by writing the new editor's name to the right of the line item. A publication being transferred may simultaneously be changed or updated; the computer will remove the publication from the original editor's Report Status printout, make any changes requested (including designating the new editor), and print out the correct information on the new editor's Report Status printout.

B315-04	RECAP OF UNITS BY SERIES OF PROJECT IDENTIFICATION												DATE SEP 05, 1969
PRJ	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TO DATE
300 BEG WIP	6278	6201	5927										
+NEW	695	594	20										1309
-CMP	772	868	168										
400 BEG WIP	5742	4900	3928										
+NEW	56	22											78
-CMP	898	994	385										
500 BEG WIP	970	740	934										
+NEW	294	554											848
-CMP	524	360	48										
700 BEG WIP	376	329	210										
+NEW	22	20											42
-CMP	69	139	20										
900 BEG WIP	1130	1151	1355										
+NEW	56	277											333
-CMP	35	73											
OTH BEG WIP													
+NEW													
-CMP													
TOT BEG WIP	14496	13321	12354										
+NEW	1123	1467	20										2610
-CMP	2298	2434	621										

Fig. 10. Recap of Units by Series of Project Identification printout

B315-03 REPORT STATUS -- WEEK ENDED AUG 29, 1969 EDITOR - MURAKAMI

REPORT IDENT	WORK ORDER	PRJ	REPORT TITLE	AUTHOR	UNITS	DATE RECVD	DATE DUE	PHASE AS OF	DELQ CODE
2 09-0390	20292	384	REV OF GAUSSIAN NOISE SIG	SIMON	24	07/30/69	/ /	X 08/25/69	
2 09-0443	20326	324	VEHICLE FLIGHT SCALING	JAFFE	5	08/21/69	/ /	A 08/26/69	
2 20-1320	20271	392	CAPSULE SYS, STERIL PROG	HOFFMAN/ETAL	~~94~~ 102	07/09/69	/ /	~~A 07/09/69~~ A 07/09/69	~~2~~
2 20-1360	50014	329	THREE BODY PROBLEM	BROUCKE	411	11/01/68	/ /	B 07/09/69	
2 20-1403	50021	328	COLD-FLOW EXP INV	STRAND	46	03/24/69	/ /	~~D 08/25/69~~ X 08/29/69	
2 20-1404	50022	~~349~~ 547	BRUSHLESS DC MOTORS	BAHM	65	03/24/69	/ /	B 06/27/69	
2 20-1448	20298	324	SHOCK WAVE STRUCT OF GAS	PASSAMANECK	59	08/01/69	/ /	A 08/04/69	2
2 30-0430	20093	980	AUTO STATUS FOR PUBS	VAN BUREN	~~91~~ 93	03/06/69	/ /	A 06/27/69	BUEHLER
2 30-0435	20208	320	PROCODOPING ON CELLS	BERMAN	172	05/21/69	/ /	X 08/27/69	
2 33-0301	50015	401	T&DA SURV V VOL III	RENZETTI	415	07/29/68	/ /	B 08/11/69	
2 34-0301	50028	401	T&DA SURV VI VOL IV	RENZETTI	451	07/29/68	/ /	B 08/19/69	
2 35-0301	50016	401	T&DA SURV VII VOL V	RENZETTI	378	07/29/68	/ /	B 08/11/69	

* *

ADDITIONS

REPORT IDENT	WORK ORDER	PRJ	REPORT TITLE	AUTHOR	UNITS	DATE RECVD	DATE DUE	PHASE AS OF	DELQ CODE
2 23-1408	20344	324	SHØCK TUBE-HELIUM	MENARD	420	09/04/69		A 09/04/69	2

KEYPUNCH: PUT FOLLOWING ITEM ON 1 AND 2 CARDS:

REPORT IDENT	WORK ORDER	UNITS	
2 20-1381	20004	75	MAPLE

Fig. 11. Report Status printout marked for input to the computer

An important aspect of the automated status reporting system is the accuracy with which the individual editor marks his changes and additions. Although many of the errors that an editor might make will be flagged in some way on the computer printout, the errors can make the printouts difficult to read and evaluate and, in some cases, can affect the statistical computations. If an editor, for instance, in transferring a publication to Jones, inadvertently writes S. Jones, the computer will consider S. Jones and Jones to be two different editors, and will print out two separate status sheets; and S. Jones and Jones will both appear on the Editor Recap printout. Similarly, if the editor does not spell the other man's name correctly (or clearly), the computer will interpret this to be a different person altogether.

Another area to watch involves the date started and as of date information. If, for example, the Open Reports Listing indicates that a publication has been in the B phase for 130 days but has been in house for only 72 days, then it is obvious that an error has been made in one of these dates. A date error is not always discernible, however, and an incorrect received or completed date could affect the Project Identification printout.

Again, if the editor writes an incorrect project number, there is no way that the key punch operator or the computer will know that it is in error; the incorrect number will be repeated on every subsequent printout. An incorrect project number would also be printed on the Project Identification printout and would cause some confusion with those figures. Similarly, an incorrect unit count insertion cannot be detected automatically, and affects the statistics on the Editor Recap printout. To preclude these kinds of errors, the status sheets are manually checked before the input is sent to the computer center.

B. Card Data

After the keypunch operator receives the marked-up status sheets, he punches the data onto one of four different types of IBM cards. These cards are labeled "A," "B," "1," and "2." The A and B cards are used for making new entries, while the 1 and 2 cards designate changes made to entries that already exist on the computer master tape.

For a new entry, there must be both an A card and a B card, with the B card representing the continuation of data from the A card. Because a new entry must contain all of the information on a line and since two cards are required to enter this information, the keypunch operator must punch both an A and a B card. He cannot punch an A card alone or a B card alone. On the other hand, he can punch either a 1 or a 2 card, depending upon the specific information that is being changed. For example, if the phase, the as of date, the delinquency code, or the editor is being changed or corrected, then the keypunch operator will punch a 2 card because this information appears on a 2 card only. Since the 1 card contains the same information as the A card and the 2 card corresponds to the B card, the operator may have to punch both a 1 and a 2 card when changes are made to more than one element of the entry line.

If the operator punches the A and B cards representing a new entry, the computer will search its files to determine whether that report identification number already exists on the master tape. If it does, the computer will not accept the data and will print out a *1* on the Open Reports Listing. If the operator punches a 1 or a 2 card, or both, then the computer will search its files for the correct report identification in order to make the change. If that publication number does not exist on the master tape, then the computer will not accept the data and will print out a *2* on the Open Reports Listing.

C. Proof List

To verify the keypunching operation, the computer provides a printout with the keypunch information exactly as it is listed on the input cards. This listing is called the Publications Work Status Proof List (Fig. 12). The listing indicates whether the card is a 1, a 2, an A, or a B card. Thus, if a *1* or *2* appears on the Open Reports Listing, the Proof List printout can be reviewed to see whether the information was correctly punched onto the card.

D. Controls

Because approximately 39 pages of printouts are received from the computer each week, there has to be some way of verifying the accuracy of what the computer has done. This verification is accomplished by taking partial (hash) totals of each of the following selected columns on the Report Status printout: REPORT IDENT, PRJ, UNITS, DATE RECVD, and AS OF. Only those entries that have actually been changed are included in the hash total for each selected column. For example, in Fig. 11, the hash totals for the PRJ column would involve only the numbers 547 and 324. An exception is made in the REPORT IDENT column hash total to

8315-01 PUBLICATIONS WORK STATUS PROOF LIST - FOR WEEK ENDED SEP 05, 1969

C C	DATE	REPORT IDENT.	WORK ORDER	REPORT TITLE	AUTHOR	UNITS	DATE RECVD.	DATE DUE	PRJ	PHASE	DATE	DELQ CODE	EDITOR	EXC
2	09/05/69	2 20-1394	20054							B	08/29/69		***	
2	09/05/69	2 20-1415	50029							C	08/29/69		***	
1	09/05/69	2 20-1419	50031	***	***	***	***	***	***					
2	09/05/69	2 20-1419	50031							*	***		CREW	
1	09/05/69	2 20-1427	50033	***	***	***	***	***	***					
2	09/05/69	2 20-1427	50033							*	***		BUEHLER	
1	09/05/69	2 20-1429	50034	***	***	***	***	***	***					
1	09/05/69	2 20-1430	50035	***	***	***	***	***	***					
2	09/05/69	2 20-1430	50035							*	***		BUEHLER	
A	09/05/69	2 20-1454	20342	SURVIVAL IN DESERT SOIL	CAMERON	00020	09/02/69	***	386					
B	09/05/69	2 20-1454	20342							A	09/03/69	2	SHAW	
A	09/05/69	2 21-1408	20344	HELIUM AND ARGON-VOL III	MENARD	00420	09/04/69	***	324					
B	09/05/69	2 21-1408	20344							A	09/04/69	2	LATHOURAKIS	
2	09/05/69	2 22-1240	20174							C	08/29/69		***	
1	09/05/69	2 22-1408	50032	***	***	***	***	***	***					
2	09/05/69	2 22-1408	50032							*	***		MURAKAMI	
2	09/05/69	2 30-0338	20167							A	09/02/69		***	
2	09/05/69	2 30-0434	20323							A	08/28/69	1	***	
1	09/05/69	2 30-0438	50036	***	***	***	***	***	***					
2	09/05/69	2 31-0385	00762							X	09/02/69		***	
2	09/05/69	2 32-0426	20112							A	09/02/69		***	

Fig. 12. Publications Work Status Proof List printout

include the report identification number whenever a correction is made to *any* entry of that line item. In Fig. 11, for instance, the numbers to be added in the REPORT IDENT column would be:

2 20-1320 } Added twice
2 20-1320 }
2 20-1403
2 20-1404
2 30-0430 } Added twice
2 30-0430 }
2 23-1408
2 20-1381

A count is also taken of all changes made to the PHASE column; for example, all of the changes to B phase are counted, all of the changes to C phase are counted, and so on. The computer also takes its own hash totals of these same columns and the computer totals are printed on the control sheet (Fig. 13), which is sent to the Publications Section with the other printouts. The totals are compared by the Publications Section and if there are no arithmetic differences then the printouts are taken to be complete and correct. If there are errors, then the numerical difference is a quick aid in locating the entry line and determining where the error exists.

The REPORT IDENT column is a 7-digit column and normally all seven digits are added to obtain the hash total for that column. However, for the periodicals group of the Publications Section, the last digit of the REPORT IDENT column is a letter rather than a number. Consequently, for the periodicals group only, six digits are added rather than seven. Since the hash totals for the periodicals group and the reports group are kept separately, this procedure is satisfactory. However, cases may occur in the reports group where the last digit of the report identification number is a letter rather than a number (see Section V). This situation, of course, poses the problem of how to add the hash totals. As it turns out, the computer adds the letter designations according to a definite scheme: the letter A is given the value of one, the letter B is given the value of two, and so on. Since there are usually only four or five letters involved, there is no trouble in adding the hash totals.

B315-06 CONTROL SHEET FOR PUBLICATIONS -- SECTION 754 FOR WEEK ENDED SEP 05, 1969

	TOTALS FOR PERIODICALS - 7541	TOTALS FOR REPORTS - 7542
REPORT IDENT	519174	75868401
PRJ		2589
UNITS		547
DATE RECVD		429545
-AS OF- DATE	90369	2230725

PHASE	COUNT
A	7
B	6
C	2
D	3
Q	
X	8

Fig. 13. Control Sheet for Publications printout

Because of the difference between the A and B cards and the 1 and 2 cards, it was necessary to set up a peculiar procedure for adding the hash totals. The situation revolved around the fact that the A and B cards must go together; that is, there cannot be a B card without an A card. On the other hand, there can be a 2 card without a 1 card, or a 1 card without a 2 card. Thus, whenever a new addition is made requiring A and B cards, the REPORT IDENT column is added only once. On the other hand, if a number of changes are made to a line item requiring both 1 and 2 cards, the report identification number is added for both cards; that is, it is counted twice. This particular procedure caused a number of errors to occur early in the program until personnel became used to making the distinction and adding the hash totals correctly.

Another area of confusion was caused by the fact that the work order number appears both on the 1 and 2 cards (see Figs. 2 and 12). When a change to the work order number was made, along with a change to, say, the phase or the editor, the question arose as to whether the report identification number should be added twice, once for the work order number on the 1 card, and once for the phase or editor change on the 2 card. In actual practice, it was done sometimes one way and sometimes the other, by both the publications personnel and computer personnel. Once the problem was recognized, however, it was very easily solved by eliminating the two card count for the work order number change.

A question came up at the beginning of the program as to whether the number of hash totals taken was excessive, considering the relative simplicity of the program. However, it only takes about 15 min to run the hash totals by hand, and it is believed the confidence that a correct set of totals gives far outweighs the slight effort involved.

E. Project List Recalculation

The fact that the Report Status printout is marked up every week and sent to the keypunch operator, does not mean that changes to the AS OF column reflect the current week's information. For any number of reasons, an editor may change the phase of a job and back date the as of date. For example, an editor might be sick for a week and add a new job in the A phase with the as of date indicating the prior week. What happens if that prior week also happens to be the prior month? On the Project Identification listing, the information is accumulated by the month. If the current reporting period is December and a new job is added effective in November, how then does the computer modify the November totals, or better yet, how does it know not to put those units in the December totals?

The answer is simply that the Project Identification listing is calculated every week in its entirety. Using the as of date for new jobs and the date completed for completed jobs, the computer goes through the entire calculation of the Project Identification listing every week. In

this manner, a new job can be back dated as far back as the beginning of the fiscal year and the printout will show the accurate figures for each month. A change in the number of units is also reflected on the Project Identification listing, for the same reason.

F. Some Numerical Conflicts

It is to be expected that the numbers shown on one type of printout will agree with the numbers shown on a different printout, and in general this is true. On the Project Identification Recap printout, for instance, the most current TOT BEG WIP column figure, plus the +NEW figure and minus the −CMP figure, represents the current backlog. This number is identical to the total shown in the TOTAL UNITS column of the Editor Recap printout.

However, the +NEW figure, by itself, (or the current week's addition to that figure) and the −CMP figure may not agree with the NEW UNITS total and the UNITS COMPL total on the Editor Recap printout, respectively. The NEW UNITS total on the Editor Recap printout will include a job that has been cancelled and reentered (as a new job) as described in Section V, whereas the +NEW figure on the Project Identification Recap will not include the job as a new one.

The UNITS COMPL total on the Editor Recap printout includes all jobs that are marked during the current week as being completed, even though the completion date is back dated to the previous month. The Project Identification Recap printout, on the other hand, will place those completed units in the proper (backdated) month, not in the current month.

G. Calculation of Elapsed Time

The DAYS IN PHASE and DAYS IN HOUSE columns of the Open Reports Listing do not show precise elapsed times, but are computed on the basis of 30 days per month. As a result, over the course of a full year the computed elapsed time may differ from an actual count by as much as 6 or 7 days. There are three formulas used by the computer in calculating the elapsed time:

$$E = J - [30(m - 1) + d] \quad (1)$$

$$E = J + 30(12 - m) + (30 - d) \quad (2)$$

$$E = J + 30(12 - m) + (30 - d) + 365y \quad (3)$$

where

E = elapsed time

J = sequential day of year for printout date

m = number of month in start date

d = day of month in start date

y = number of years prior to previous year

When the start date occurs in the current year (1969 in this case), Eq. (1) is used. Thus for a printout dated April 18, 1969 (day 108 of the year) and a start date of 02/03/69 as shown in the DATE STARTED column, the equation would read

$$E = 108 - [30(2 - 1) + 3] = 75$$

If the start date occurs in the previous year (1968 in this case), Eq. (2) is used. Thus for a start date of 4/30/68 and the same printout date as above, the equation would read

$$E = 108 + 30(12 - 4) + (30 - 30) = 348$$

Equation (3) is the same as Eq. (2) except that for every year prior to (in this case) 1968, the computer adds 365 days.

V. Program Constraints

A. Changing Report Identification Numbers

In actual operation, the computer generates a master tape, which contains all of the open and closed jobs in sequence by publication number. The master tape contains all of the information shown on the Open Reports Listing and on the Completed Reports Listing. Whenever a change is made to any of the elements on a line entry, the computer searches the master tape for the correct report identification number prior to making the required changes. The report identification number thus becomes the master identification key for the computer, and a problem obviously arises if it becomes necessary to change this number.

For example, suppose a mistake were made in writing down a new report identification number and the following week the editor crossed out the number and wrote the correct one above it. The computer would see this as a change to a job that did not exist, since the new number had not been entered onto the master tape. Since

transcription errors are inevitable, the question is how to get the computer to change or eliminate a report identification number.

As described in Section III, a job is kept on the Completed Reports Listing for one year and then it is dropped. If the date completed, as shown on the listing, is more than one year prior to the date of the current report, the computer will erase that entry from the master tape and will print the word DROPPED on the Completed Reports Listing. That line entry will thereafter no longer exist. Thus to cancel or eliminate a report identification number, the editor simply changes the phase to Q (cancelled) and enters an as of date that is more than one year prior to the current date. The job will then be immediately dropped from the master tape but will appear (once) on the Completed Reports Listing with the word NEWDROPPED beside it.

If it were done exactly this way, the cancelled jobs would show up on the Editor Recap printout as a completed job; the units would be entered in the CURR UNITS COMPL column and would also be added into the total units completed at the bottom of the Completed Reports Listing. To avoid producing such errors in the statistics, when the editor cancels this job he also changes the number of units to zero. As it turns out, before cancelling the job the computer will make all necessary changes to the line items for that job, and the unit count will not enter into any statistical information.

To correct a report identification number, it becomes necessary to cancel the number as just described and to reenter the job with the correct information as a new addition. Actually this becomes a rather tedious method for correcting the report identification number; therefore, a great deal of care is taken to make sure that the identification number is correct to begin with.

B. Reentering a Line Item

An interesting phenomenon occurs when a job is canceled and reentered under a new report identification number as described in the above paragraph. Although the incorrect or cancelled job is changed to zero units prior to cancellation, the correct or newly added input must reflect the correct number of units. As a result, the job now appears on the Editor Recap printout as a new job and the proper number of units appears in the CURR NEW UNITS column. This entry is obviously an erroneous statistic, since the job had been previously added as a new job under the old number. The job will also appear as a new line item on the Open Reports Listing; that is, the word NEW will appear as though the job were actually new. From the computer point of view the job really is a new one since it is now listed under a new number.

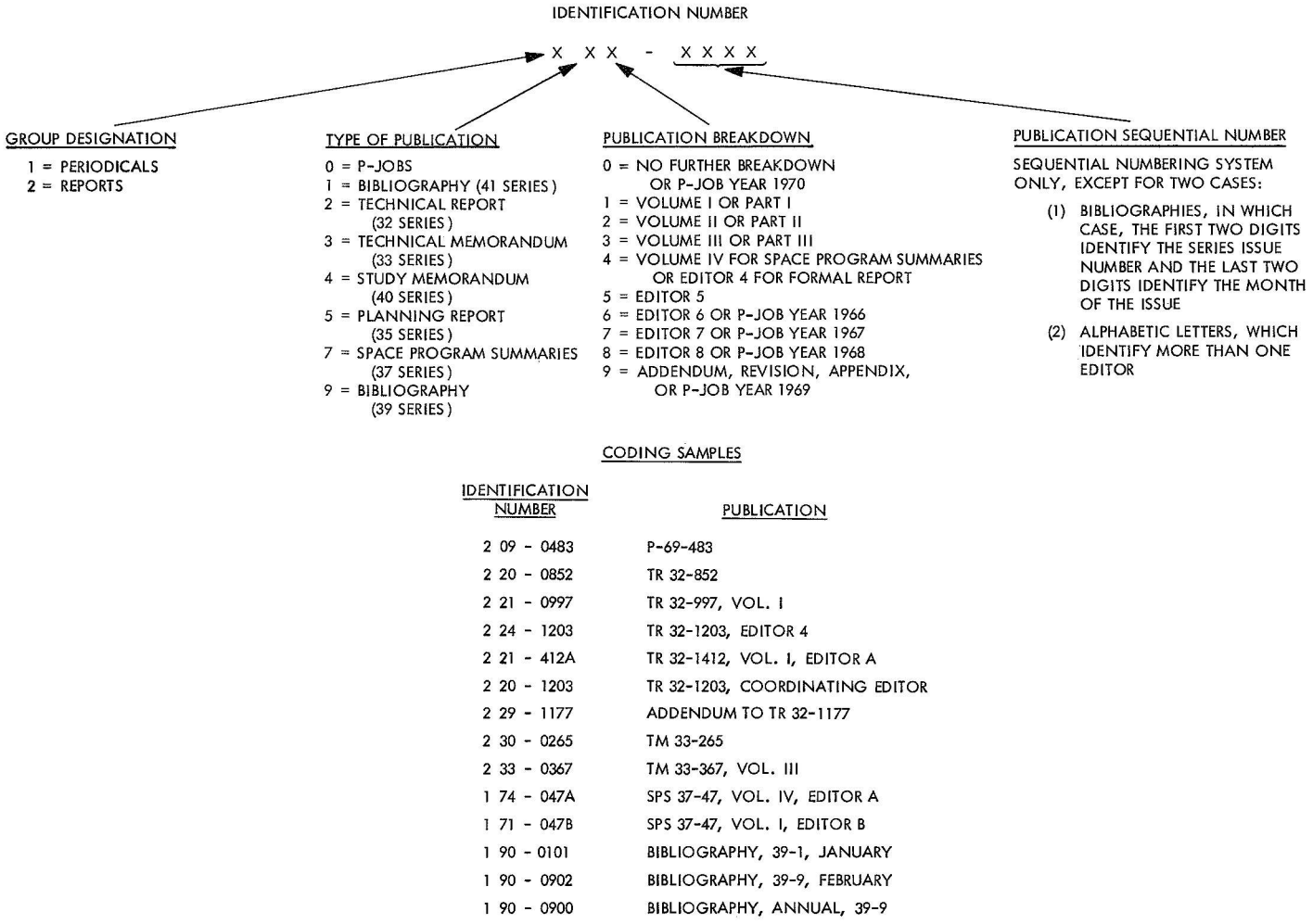
It might also be thought that the Project Identification listing would also reflect wrong statistical information in the same way and for the same reason; however, there is no effect on the Project Identification listing because this listing is recalculated each week in its entirety. Suppose for example, that a job comes in during August and is duly noted as an input on the Project Identification listing. Then assume that the job is canceled with zero units, as previously described, and is reentered under a new number with the as of date the same as before (i.e., August). In recalculating the Project Identification listing, the computer will not include the canceled job because it has now been removed from the master tape. In its place, however, it will pick up the information for the new job, and since the date received is still shown as August, the figures for August will remain exactly the same.

C. Coding

At the present time, seven digits are available for the report identification number. These digits are coded as shown in Fig. 14.

The publication breakdown digit is used to indicate volumes, parts, appendixes, addenda, revisions, and multiple editors. The necessity of indicating mutiple editors arises from the fact that some jobs are quite large and require more than one editor. In such cases, several editors are assigned to the job, with one editor appointed as cognizant editor for overall coordination. Each editor lists his portion of the job separately on his own Report Status printout, because he handles that portion from the edit phase all the way through to the final repro phase as an integral unit, as though it were a completely separate job. The status of each editor's portion of the job can thus be determined separately. However, with five editors working on a single job, it becomes difficult to maintain the integrity of the report identification number and still give each editor a distinct and different code. Thus, in the publication breakdown digit, we have assigned numbers 4, 5, 6, 7, and 8 to represent different editors (second through sixth editor, respectively) on a single job.

An unfortunate feature of this system is that the report identification numbers for the same job do not all appear



CODING SAMPLES

IDENTIFICATION NUMBER	PUBLICATION
2 09 - 0483	P-69-483
2 20 - 0852	TR 32-852
2 21 - 0997	TR 32-997, VOL. I
2 24 - 1203	TR 32-1203, EDITOR 4
2 21 - 412A	TR 32-1412, VOL. I, EDITOR A
2 20 - 1203	TR 32-1203, COORDINATING EDITOR
2 29 - 1177	ADDENDUM TO TR 32-1177
2 30 - 0265	TM 33-265
2 33 - 0367	TM 33-367, VOL. III
1 74 - 047A	SPS 37-47, VOL. IV, EDITOR A
1 71 - 047B	SPS 37-47, VOL. I, EDITOR B
1 90 - 0101	BIBLIOGRAPHY, 39-1, JANUARY
1 90 - 0902	BIBLIOGRAPHY, 39-9, FEBRUARY
1 90 - 0900	BIBLIOGRAPHY, ANNUAL, 39-9

Fig. 14. Report identification number coding chart and samples

on the Open Reports Listing in the same spot. For example, the following numbers represent a single job with multiple editors:

2 20-1367

2 24-1367

2 25-1367

2 26-1367

It is obvious that a job with the numbers 2 20-1368 and 2 24-1368 will intervene in the Open Reports Listing between the first, second, and third entries listed above. It is also obvious that any number of jobs could intervene between any of the above listed numbers, so that this single job with multiple editors (or with multiple volumes, or with an addendum) is scattered all over the Open Reports Listing.

Another difficulty in using the publication breakdown digit to indicate multiple editors is that it cannot then be used to also indicate a volume or an addendum. What happens if Volume I of a publication has to be split among several editors? To avoid this kind of conflict, an alphabetical sequence is used at the end of the report identification number; the cognizant editor is indicated by the letter A, and other editors by subsequent letters. For instance, the number 2 35-0301, which indicates a secondary editor (5) on Technical Memorandum 33-301, would be coded as 2 30-301B; if the publication were Volume II, the number would be coded as 2 32-301B. Obviously this method provides more flexibility, although it also introduces some other problems.

When using such alphabetic designations, care must be taken in adding up the report identification numbers to obtain a hash total (as described in Section IV-D).

The letter cannot simply be dropped from the computation, as in computing the hash totals for the periodicals group; the numerical values of the letters must be used. The difference in handling the hash totals for this case and for the periodicals group must be remembered by the person adding the hash totals.

Another problem became evident when it was necessary to use the letter designation for multiple editors on a Technical Report in which all of the last 4 digits were significant. In the above TM number, for example, the first zero in 2 35-0301 is not significant in designating the publication number TM 33-301. When the letter designation is used, therefore, this zero can be eliminated and everything shifted one place to the left. But with a publication number like TR 32-1412, Volume I, which would normally be coded as 2 21-1412, how can the letter designation be used? Since the Laboratory publishes approximately 200–300 Technical Reports per year, it would be highly unlikely, if the 1 were dropped, that the remaining digits (412) would be erroneously taken to designate Technical Report number 32-2412 or 32-3412. The publication number can thus be coded unambiguously with letter description for the editor as 2 21-412A (see Fig. 14).

When a publication is divided among several editors, the individual efforts eventually come together as one publication, usually at the C phase (camera-ready copy). At that time, the cognizant editor takes over the entire publication; he changes the report identification to a proper code and modifies the unit count to reflect the whole effort. At the same time, the other editors delete their portions of the job from the computer tape by changing all units to zero, changing the phase to Q, and backdating the as of date at least 1 year (see Section V-A).

Aside from the increased flexibility, a distinct advantage in using the letter code designation for multiple editors is that all portions of the job will appear together on the Open Reports Listing printout. Nonetheless, a more satisfactory way of handling the multiple editor–multiple volume situation would simply be to have a nine-digit report identification number instead of the seven-digit one currently being used.

D. Changes to the Completed Reports Listing

It occasionally happens that we want to change the information concerning a job that is already listed on the Completed Reports Listing. The entry no longer exists on the Report Status printout, so that the editor cannot simply cross out the old information and add the new information. If the editor adds the report as a new entry below the line of asterisks, the computer will reject it as a *1* anomaly; that is, an attempt to add a job that already exists on the master tape. However, the computer will do this only if the information is punched on A and B cards. If the information is punched on a 1 card or a 2 card, the computer will simply locate the report identification number, make the change, and print out the job on the proper listing. Thus, to make a change to a closed-out job, the editor writes the information below the asterisks and instructs the keypunch operator to place that information on a 1 or a 2 card rather than on an A or a B card. An example of such an instruction is given in Fig. 11.

By this method, we are able to accomplish two things: to correct or update the information on the Completed Reports Listing; and, by simply changing the phase to A, B, C, or D, to pull a job from the Completed Reports Listing and put it back on the Open Reports Listing (thus making it once again an active job). When this latter operation is done, there is no effect on the Editor Recap printout. However, there is a very definite effect on the Project Identification printout, because the master tape no longer shows the job to have been completed as of a certain date, and the units will be subtracted from the statistics for the appropriate month on the Project Identification printout. This is a good example of how the Project Identification printout is kept accurate and up-to-date at all times.

E. End of Year Carryover for Project Identification Printout

There is one condition in which information is completely lost by the computer and can only be retrieved by a manual effort. This condition involves the Project Identification printout and occurs at the crossover of the fiscal year; that is to say, from June to July (the Jet Propulsion Laboratory fiscal year begins 1 July).

The problem involves the fact that in July, when the project list is beginning another fiscal year, the computer may receive information concerning the addition and completion of jobs backdated to the previous fiscal year, say to the previous June. Since the information is not applicable to the current fiscal year, and since all data concerning the previous fiscal year is dumped from the computer memory bank, it is not included in the statistics, and there is no way of picking up the information— it is simply lost. For example, if in July a job is marked for completion (X phase) and if the completion date is June 15th,

then the Project Identification printout for the current fiscal year will have no way of recording that information. The Project Identification printout for the previous fiscal year can no longer be corrected by the computer program. The only way to record the information is to manually add the correct number of units to the June column of the previous fiscal year listing on the units completed —CMP line. When this is done, however, it must be remembered that the Project Identification Recap printout must also be changed to agree with the new figures.

This inconvenience is not considered too serious since it only occurs once a year, and since it only involves those few jobs that are backdated from July to May or June. So long as the situation is known, it can easily be compensated for.

F. Delinquency Code Tie-In

Another constraint of the program, as it is currently written, is the fact that the delinquency code is tied directly to the phase and the as of date on the Report Status printout. One of the reasons this is an inconvenience is that the delinquency code is not really being used as originally intended; that is, as a true delinquency indicator. Originally it was thought that, if a job were 30 days or more delinquent, it would be well to indicate whether that delinquency were caused by the Publications Section or by factors outside publications personnel control. Thus, a 2 would represent a Publications Section holdup and a 1 would represent a holdup "out of our control." When the phase changed, the job would no longer be delinquent and the program was set up so that the delinquency code would then be deleted automatically.

The delinquency code is now being used partially to indicate a backlog situation, and only partially as a delinquency indicator. The number 1 indicates a holdup that is "out of our control" while a 2 indicates that the editor has backlogged the job as a result of his working on other jobs. When an editor wishes to begin a job that has been backlogged, he must change the A phase to A again and must change the as of date to a more current date. This will automatically delete the delinquency code and will indicate that the report is actually in the editorial phase. In a way, this is an advantage to the editor since he can now indicate more accurately where his efforts are being applied.

However, it would have been just as easy for the editor to be able to change the as of date and delete the number 2 in the delinquency column without having the mechanical tie-in between the two. The point is that there is very little flexibility in the use of the delinquency code column; and if, at some future time, it were found desirable to use the column for some other purposes, the tie-in to the phase and as of date would make it awkward if not impossible.

G. Date Due

One of the unforeseen features of the program is the fact that the DATE DUE column of the Report Status printout is not frequently used. In cases where production time is a problem, the simple listing of a due date is not adequate to control the schedule; a more comprehensive system is employed. Also, the DATE DUE column does not appear on any printout except the Report Status printout. Consequently, it would be of use primarily to the editor only; the editors are already well aware of any critical due dates concerned with any of their jobs.

H. Zero Suppress

A convenient feature of all the listings produced by the computer is the elimination of unnecessary zeros. This feature was planned for at the beginning of the program, but for some reason when the program became operational the zero-suppress feature was applied to all of the printouts except the Open Reports Listing and the Report Status printout.

The UNITS column for all of the listings is a 5-digit column, and a comparison of the Open Reports Listing with zero suppress and without zero suppress is shown in Fig. 15. Because of the difficulty in reading the numbers without zero suppress and particularly in picking out 3-digit versus 2-digit numbers, it was thought worthwhile to amend the program immediately to include the zero suppress feature on all listings.

I. Insufficient Digits

On the Open Reports Listing, the two columns DAYS IN PHASE and DAYS IN HOUSE indicate the number of days that a job is delinquent, as explained earlier. Each of these columns is a 3-digit column and during the program design stage it was never imagined that a job would be in house or in phase more than 999 days.

However, there were two jobs that were in work for more than this length of time, and since there were only 3 digits available on the Open Reports Listing, the computer had no way of indicating the true statistics of the

UNITS	EDITOR	UNITS	EDITOR
00074	MAPLE	74	MAPLE
00040	ANNIGIAN	40	ANNIGIAN
00109	SHAW	109	SHAW
00232	ANNIS	232	ANNIS
00048	ANNIGIAN	48	ANNIGIAN
00298	SWEENEY	298	SWEENEY
00245	SHAW	245	SHAW
00145	WALLENBROCK	145	WALLENBROCK
00051	SWEENEY	51	SWEENEY
00038	SANDERS	38	SANDERS
00045	MAPLE	45	MAPLE
00077	SWEENEY	77	SWEENEY
00365	ANNIS	365	ANNIS
00099	MAPLE	99	MAPLE
00033	MURAKAMI	33	MURAKAMI
00073	BUEHLER	73	BUEHLER
00140	SANDERS	140	SANDERS
00062	ANNIS	62	ANNIS
00084	WALLENBROCK	84	WALLENBROCK
00010	GODFREY	10	GODFREY
00073	ANNIS	73	ANNIS
00086	SHAW	86	SHAW
00021	MAPLE	21	MAPLE
00047	SWEENEY	47	SWEENEY
00075	SANDERS	75	SANDERS
00034	MAPLE	34	MAPLE
00149	SWEENEY	149	SWEENEY
00107	ANNIS	107	ANNIS
00030	ANNIS	30	ANNIS
00061	SANDERS	61	SANDERS
00076	ANNIGIAN	76	ANNIGIAN
00138	CREW	138	CREW
00010	ANNIS	10	ANNIS
00055	GODFREY	55	GODFREY
00008	ANNIGIAN	8	ANNIGIAN
00064	SHAW	64	SHAW
00451	MAPLE	451	MAPLE

Fig. 15. An example of "zero suppress"

situation. Thus, a report that had been in the C phase since 1965 showed no printout whatever in the DAYS IN PHASE column since the actual time involved was between 999 and 1030 days. Had the time been less than 999 days, the number, of course, would have been printed in the DAYS IN PHASE column. Also, if the number involved had been greater than 1030, at least the last two digits would have appeared in the DAYS IN PHASE column. As it was, the DAYS IN PHASE column was blank, while the DAYS IN HOUSE column showed a 2-digit number. The extreme delinquency of this job could not be readily spotted on the Open Reports Listing.

The other job showed a rather peculiar circumstance in which the DAYS IN PHASE column showed a number larger than the DAYS IN HOUSE column. In this case, the job had been in-house since 1965 but had only recently gone into the circulation or approval phase. Thus, the DAYS IN PHASE column showed 89 while the DAYS IN HOUSE column indicated 57. The true number, of course, for the DAYS IN HOUSE column was 1057.

Fortunately, only two publications have thus far been known to create this kind of a problem, and a cursory glance at the year shown in the DATE STARTED and AS OF columns will immediately spotlight any similar circumstances.

J. Recap of Anomalous Features

It is anticipated that, at some future date, a revision to the computer program will be made not only to solve some of the problems that have been mentioned in this section but also to enlarge the scope of the program beyond its present capabilities. Following is a list of program modifications that may be considered if ever the program is revised.

(1) Expand the report identification number from seven digits to nine digits.

(2) Unhook the delinquency code from the phase and as of date, and separate the as of date from the phase.

(3) Eliminate the DATE DUE column.

(4) Make the DAYS IN PHASE and DAYS IN HOUSE columns 4 digits each.

(5) Eliminate unnecessary columns from the Editor Recap printout.

VI. Expansion of the Program

There are two ways in which the program, as described here, can be expanded to yield additional information. The first, and perhaps the most obvious way, is to revise the entire program. A revision to the program would be required, for example, if input data to the program had to be added or deleted, or if the current printouts needed to be changed in some way. The second method is to add access programs that, using the information already available on the master tape, manipulate the data and produce printouts different from the normal program.

A very simple access program is one that would produce a printout of both the open and closed listings in alphabetical sequence by author name. Such a printout would be very useful in locating reports by authors, the necessity for which occurs quite frequently. The same program could also provide the number of authors for both the active list and the completed list, so that this information would be continually updated and available. Similarly, the active and completed lists could also be printed out in other sequences, such as by project number, by work order number, or date received.

Another access program could be written to provide information concerning the sizes of the reports produced by the Laboratory. The computer could print out a simple table such as Table 1. One of the more interesting

Table 1. Proposed printout of report size and turnaround time

Size of report, units	Currently active reports	% of total active reports	Delivered reports (cumulative)	% of total delivered reports	Average time in house, days
0–25					
50					
75					
100					
125					
150					
175					
200					
225					
250					
275					
300					
325					
350					
375					
400					
425					
450					
475					
500					
>500					
Average turnaround time, days:					

pieces of information from this printout would be the average turnaround time for jobs of different sizes. The information concerning the actual sizes of the jobs would be quite significant, particularly when compared with the same information for delivered jobs on a cumulative basis. The editing and production involved in a large publication is considerable different from that required for a small one, and when large publications begin to predominate, then the operation of the edit, art, proofreading, and production functions is significantly affected. Therefore, it would be advantageous to have this kind of information and to be able to spot changes in the character of the workload.

VIII. Using the Program as a Management Tool

A. Importance of Turnaround Time

One of the most important features of the program is its ability to provide timely information to management. In order to do this, it is necessary that the turnaround time between sending the weekly changes to the computer and receiving the corrected printouts be as short as possible.

The actual turnaround time currently in use is from Friday noon to Monday noon. The marked-up Report Status sheets are collected from the editors Thursday night and are checked out on the same day. The control figures are tabulated and the material is packaged ready for delivery to the keypunch operation. On Friday morning, the material is sent to the keypunch operation by special courier and the material is usually keypunched Friday afternoon. The computer run is made first thing on Monday morning and the printouts are delivered by courier back to the Publications Section by Monday noon. The speed of this turnaround time has contributed significantly to the usability of the system.

B. Types of Management Information

Information can be derived from the printouts for use in predicting manpower, scheduling, and production requirements. This information is easily transferred to chart form for analysis as illustrated by the following examples.

1. Backlog. Figure 16(a) is a chart of the reports group backlog plotted from the TOTAL UNITS column of the Editor Recap printout. The reports group backlog is an indication of the number of units in work at any given time. The trend of this line over a 4- to 6-mo period is a good indication of what is happening to the workload of the reports group.

Figure 16(b) is a chart of the average size of all formal reports in work at any one time. The striking similarity of this chart with the one in Fig. 16(a) indicates that the backlog is affected more by the size of the reports than by the number of them. Larger reports are more difficult to handle, and take more time to produce. An interesting fact that can be deduced from these two charts is that the rapid increase in backlog occurred shortly after the *Surveyor* and *Mariner V* flights were terminated, indicating that the large reports received at that time were the project mission reports and final reports. Since project reports tend to be larger than other kinds of JPL formal reports, it may well be possible to predict an increase in publications workload following the termination of a space mission.

The chart in Fig. 17 is a plot of the number of journal and meeting papers contributing to the overall backlog of the reports group. This chart is plotted from the Editor Recap printout using the figure from the P JOBS column. The effort to produce journal and meeting papers is entirely different from that required to produce formal

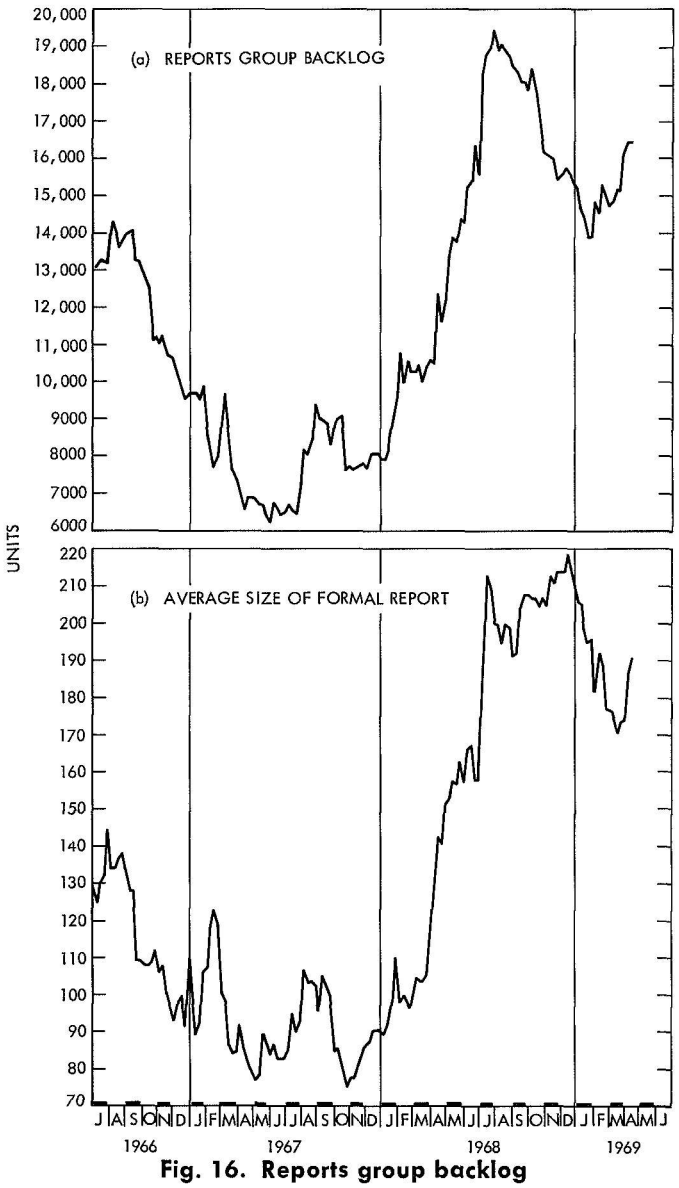


Fig. 16. Reports group backlog

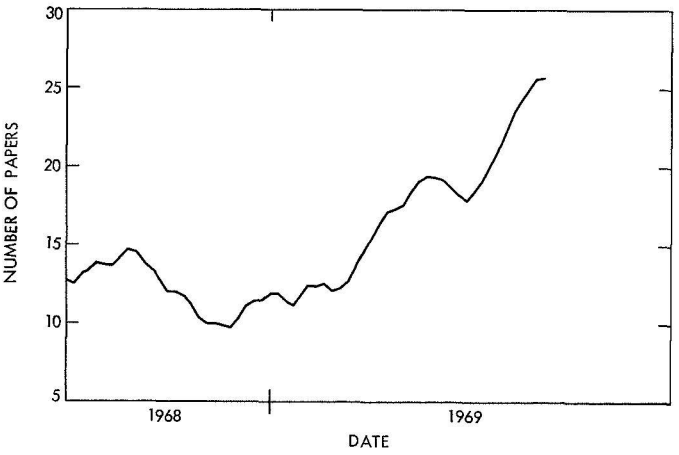


Fig. 17. Journal and meeting paper backlog, 10-wk running average

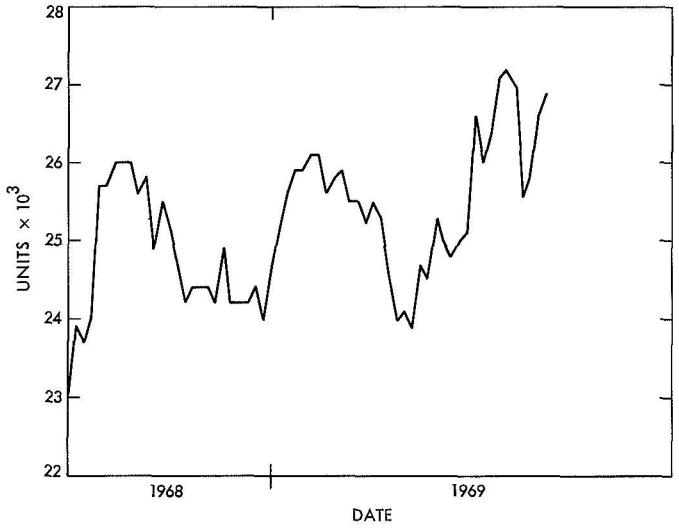


Fig. 18. Reports group deliveries, 52-wk running total

publications. Meeting papers, in particular, are usually produced under serious time constraints and the effort involved in meeting the deadlines is not compatible with the pages involved. Because of their delivery requirements, the backlog of journal and meeting papers directly affects the production of formal publications, and the trend of this backlog is meaningful information to management.

2. ***Deliveries.*** Figure 18 is a plot of the total units figure shown at the bottom of the Completed Reports Listing after the cancelled units (marked Q) have been subtracted. The chart is actually a 52-wk running total of reports group deliveries in units. This information provides another way of looking at the performance of the group and is used in conjunction with the information shown in Fig. 16(a). From Fig. 16 it can be seen that the peak of the backlog occurred in August and September 1968. Figure 18 shows that increased deliveries resulting from the effort to reduce this backlog began to appear in the second quarter of 1969.

Another way of looking at deliveries is shown in Fig. 19. This chart is plotted from the monthly total —CMP column figures at the bottom of the Project Identification Recap printout, and shows the number of units completed each month. An interesting similarity can be seen when the monthly deliveries for 1969 are superimposed over the monthly deliveries for 1968, suggesting something like a seasonal influence. As yet, no rationale has been developed to explain such an effect.

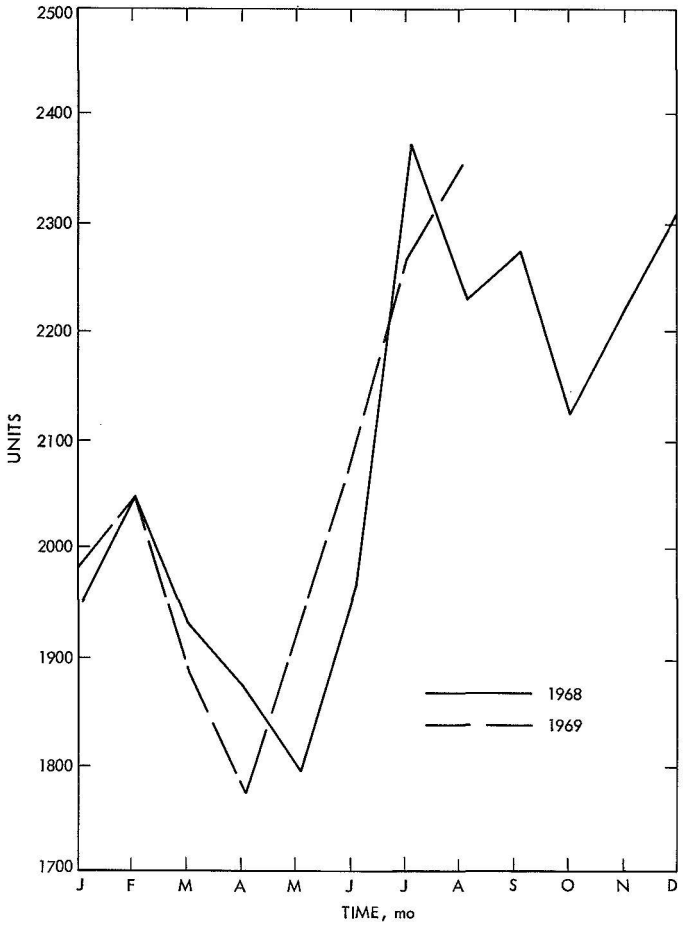


Fig. 19. Reports group monthly deliveries, 6-mo running average

3. *Inputs.* The work of the Jet Propulsion Laboratory covers several areas such as research and advanced development, flight projects, tracking and data acquisition, etc. The Publications Section receives manuscript inputs from all of these areas, and the automated status reporting system keeps track of these inputs. Where the work comes from is a significant piece of information, particularly in predicting future workloads.

Figure 20 is a plot of the figures shown in the TO DATE column on the Project Identification Recap printout, taken at the end of the fiscal year. It shows the number of units submitted to the reports group by each of the task areas of the NASA/JPL contract for both FY 68 and FY 69. In FY 68, the flight projects area produced the most workload in terms of units, although the research and advanced development area runs a close second; the *Mariner* Venus 67 and *Surveyor* projects were both producing a large quantity of final reporting during this period. In FY 1969, the input from the flight project area was drastically reduced, whereas the input from research and advanced development increased about 20%. This change reflects the effort of the Laboratory during this period, in that *Mariner* Mars 1969 was the only active flight project, and its final reporting was not available in FY 69.

The information shown in Fig. 20 is plotted on an annual basis. If the same information is plotted on a monthly basis, the result is the chart shown in Fig. 21. This illustration has the advantage of showing periodic

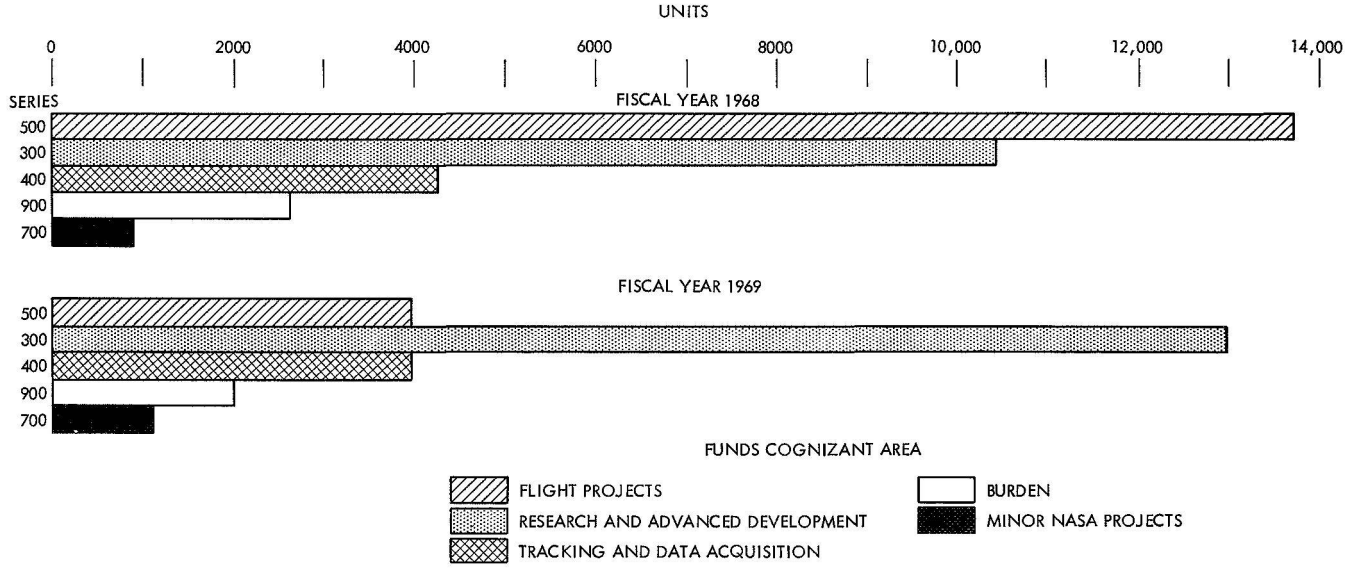


Fig. 20. Reports group input by NASA task series

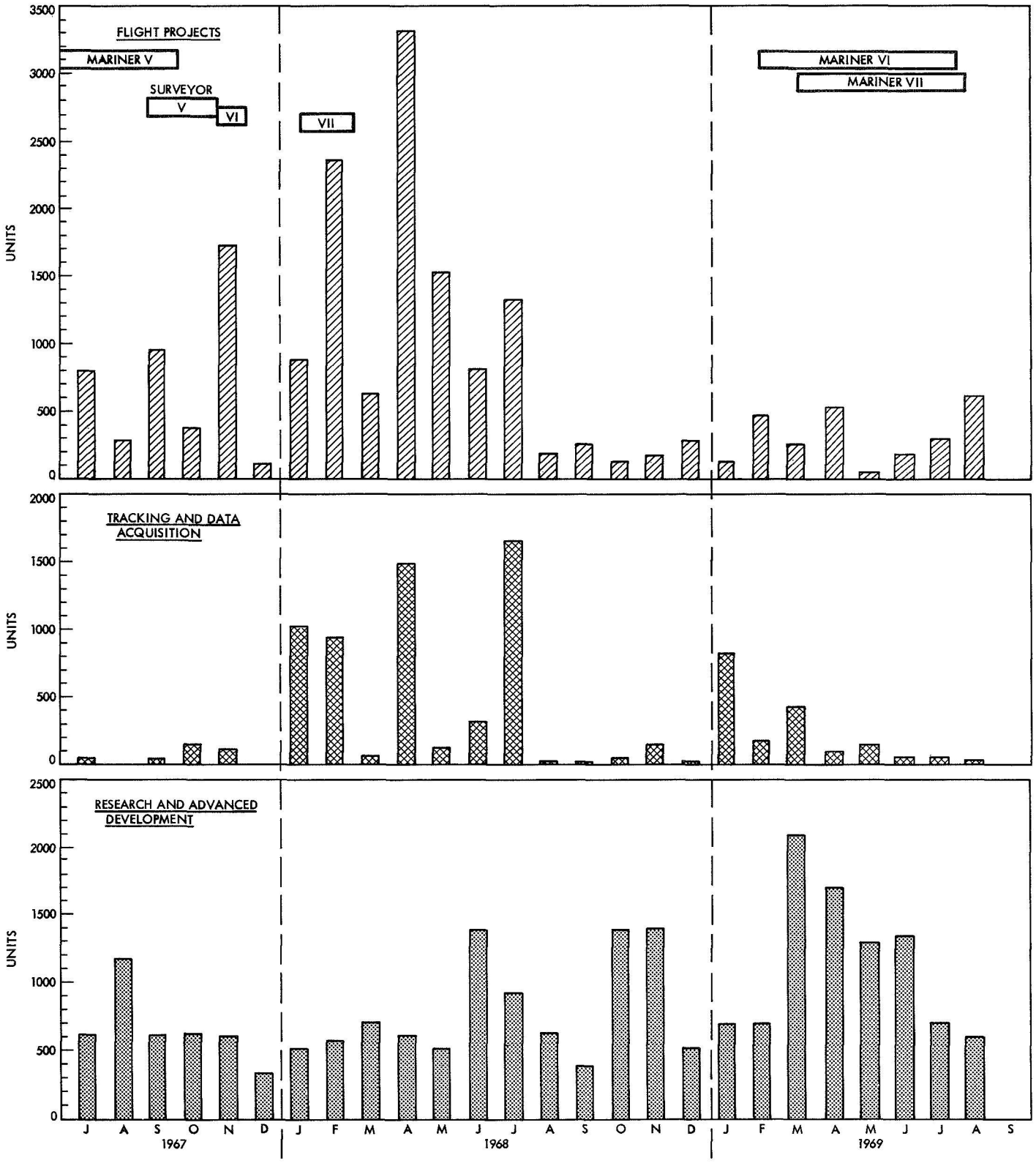


Fig. 21. Reports group monthly input from major NASA tasks

variations of the input in each of the three most significant areas. Flight project input, for example, tends to be highly volatile and is related in time to the actual space flights. Tracking and data acquisition input is even more sporadic, but it too is somewhat related to the space flights, although perhaps not so neatly. The research and advanced development inputs, on the other hand, are much more steady than the other two. Interestingly enough, these inputs increased during the latter part of 1968 and the first half of 1969, during a period when the other areas were almost dormant.

Because the flight project inputs are by far the largest, when they occur, and comprise more pages per report, it is meaningful to try to predict when these inputs can be expected and how large they are liable to be. Figure 22 shows the input from the *Mariner* Venus 67 (*Mariner V*) project plotted against the flight time. Final reporting is obviously done after the flight is over; the question is "how long after?" In the case of *Mariner V*, the bulk of the material came in 4 to 6 mo after the flight. There is no guarantee that other flight projects will follow suit; however, we can now make a fairly intelligent guess about *Mariner* Mars 1969, and with that information behind us, an even better guess about *Mariner* Mars 1971.

This kind of information, together with knowledge about production capability, takes some of the guesswork out of predicting future manpower and budget requirements, and in general provides for a smoother operation in producing formal publications.

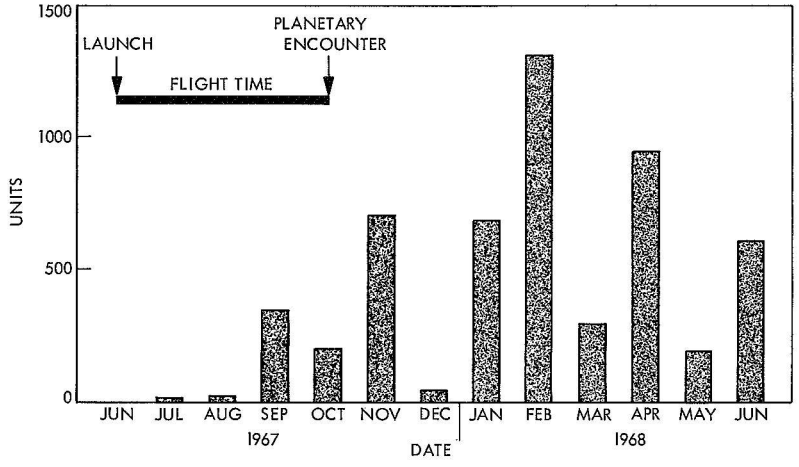


Fig. 22. *Mariner* Venus 67 inputs